

SUBSTANCE  
OF THE INVESTIGATIONS REGARDING  
CHOLERA ASPHYXIA:

WITH CASES AND DISSECTIONS,  
COMMUNICATED BY PROFESSOR DELPECH, AND DR COSTE OF  
MONTPELIER, AND DR LOWENHAYN OF MOSCOW,  
DURING THEIR RESIDENCE IN THIS  
COUNTRY.

TO WHICH ARE ADDED, OBSERVATIONS ON  
THE DISEASE IN EDINBURGH,  
AND THE NEIGHBOURING DISTRICTS,  
WITH  
NUMEROUS CASES AND DISSECTIONS.

BY JOHN LIZARS,

PROFESSOR OF SURGERY TO THE ROYAL COLLEGE OF SURGEONS, SURGEON TO THE  
ROYAL INFIRMARY, AND ONE OF THE MEDICAL OFFICERS TO THE  
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When desolation and death begin to thicken around, reason becomes silent, and the  
phantom of CONTAGION, like ghosts in darkness, takes undisputed possession of the uncon-  
firmed mind.

M'LEAN *on Pestilential Diseases.*

EDINBURGH:

JOHN HAMILTON, 15, SOUTH ST ANDREW STREET;  
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1841

THE HISTORY OF THE

REIGN OF

CHARLES THE FIRST

BY

JOHN BURNET

ESQ.

OF

THE

UNIVERSITY OF

EDINBURGH

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Printed by ANDREW SHORTREED, Thistle Lane.

TO  
PROFESSOR DELPECH,

OF MONTPELIER,

IN ADMIRATION OF THOSE TRANSCENDENT TALENTS

WHICH COMBINE THE ENLIGHTENED VIEWS

OF THE

PHILOSOPHER AND THE PHYSICIAN

WITH THE

MANUAL DEXTERITY OF THE SURGEON,


THESE OBSERVATIONS

ARE INSCRIBED

BY

HIS SINCERE FRIEND,

JOHN LIZARS.



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## P R E F A C E.

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So much has been written on this direful scourge of humanity, which has called forth the energies of the whole medical profession, that the Author would have paused before presenting his researches to the Public, had not his pathological investigations been confirmed by the indefatigable labours of the eminent Delpech, of Montpellier, and his able coadjutors.

He hopes that their conjoint results will prove to the Medical Profession, and the Public at large, that Cholera is not a mysterious, but an explicable disease, and that it is as free of contagion as a cut finger or an amputated limb.



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## ERRATUM.

In page 29, Foot Note.

This foot note should have been appended to Case VI. page 32, and in its stead,—“ This dissection was performed by Dr Coste and myself, to which some hours were devoted.”



# RESULT OF INVESTIGATIONS

BY

PROFESSOR DELPECH, DR COSTE, & DR LOWENHAYN,

COMMUNICATED TO

PROFESSOR LIZARS.

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*Edinburgh, February 22, 1832.*

SIR,

I hasten to reply, in my own name, and in that of my colleagues, Dr Lowenhayn of Moscow, and Dr Coste of Montpelier, to the anxious request which you have made to us, to be informed of the result of our examination of the various bodies of patients, who have died of cholera, which we have had an opportunity of dissecting. We reckon upon a similar communication on your part, agreeably to your kind promise. The repeated marks of attention which we have received during our stay in Scotland, give us assurance of continued good will; and by an interchange of the results of our labours, we may perhaps contribute to throw some light upon a practical question, the solution of which is of the greatest importance to all Europe. For my own part, I am satisfied that our efforts have not been without success, since the results of our anatomical inquiries have fixed the attention of one so justly celebrated, and have already been verified by him. Your

approbation of our pathological views, with reference to the subject in question, inspires us with a hope that they must be correct.

The opinion of the celebrated Loder of Moscow, that the central parts of the ganglionic nerve may be the seat of the essential morbid affections of cholera, had forced itself upon me before I was aware of its having been entertained by another. The nature and progress of the symptoms gradually led me to this conclusion, as the most probable. I acquired great confidence in my opinion, when I learned that it had been entertained by a person of so sound judgment; although I resolved to be guided solely by observation, without favouring one opinion more than another, when I left the Continent for the purpose of studying the disease in the British Isles. But in my anatomical researches, I could not neglect the attentive examination of an organic apparatus, to which my attention was so clearly directed by the general nature of the symptoms.

Having visited several patients at Musselburgh, we took advantage of the permission which we had received of inspecting the bodies of such as should fall victims to the disease. The first opportunity occurred on the 12th of February. Dr Coste, not having regularly visited the patient, has not been able to add the history of the disease to that of the dissection, which was made by him in presence of Drs Dunbar, MacColl, Ronaine, and Moir.\*

\* The history is here subjoined from the notes of my intelligent friend, Dr Dunbar, house physician to the cholera hospital of Fisherrow.

A woman of the name of Donally, aged thirty-two, had been:



The pleuræ without effusion.

The lungs in the natural state.

The pericardium distended by gaseous fluid, but without serous effusion.

The right cavities of the heart filled with black blood, partly liquid and partly coagulated. The left ventricle half filled by a single clot; the left auricle empty.

The venæ cavæ, and their principal branches, were only partially filled with black and grumous blood. No blood, fluid or coagulated, in the pulmonary veins.

All the arteries nearly empty, with the exception of the aorta, which contained a single clot.

The liver, spleen, and kidneys, in the natural state, only the veins of these organs were filled with black blood; the gall bladder contained a little bile.

for three weeks labouring under diarrhœa, with occasional sensation of numbness and twitching pains in the legs. Early on the morning of the 10th February, she was seized with all the symptoms of malignant cholera. When admitted, at twelve next forenoon, her face was blue and collapsed, and the surface of the body covered with a cold clammy sweat. No pulse at wrist, and pulsation in carotids feeble. A draught of warm water, with three spoonfuls of mustard, with difficulty produced pretty copious vomiting. An injection of warm water, with brandy, was thrown up the rectum, and, in the course of an hour, two more were administered without the brandy. During this time, we were endeavouring to restore the heat of the surface by the constant and repeated application of very hot linen cloths, and by the exhibition of stimuli by the mouth. In the course of three hours the woman had recovered, in some degree, from collapse. She put some questions to the nurse, addressed a prayer to God, and expressed herself relieved. The heat of body was in some degree restored, but still no pulse was perceptible. The above practice was repeated; but, towards the evening, she sank rapidly, and died about midnight of the 11th.

The urinary bladder contracted and empty.

The stomach distended by a great quantity of fluid similar to that which the patient had vomited. This fluid was serous, with dense, white flakes. The same fluid existed in large quantity in the large intestines. The small intestines contained but little of it, and were in a state of suffusion. The peritoneum without serous exhalation, but white, and not injected.

The mucous membrane of the alimentary canal without perceptible alteration.

The neurilema of the solar plexus of the ganglionic nerve infiltrated. The infiltration thick and shining; remarkable for these two properties. The matter with which the neurilema was infiltrated was dense, and did not flow under the application of suction. This infiltration was more abundant in the centre of the plexus than at its circumference.

This dissection having been the first, and, moreover, having been made in an inconvenient place, the inquiries were not carried so far as could have been desired.

The second case was that of a woman, named Janet M'Adam, aged seventy years, who had not been in extreme indigence, but who lived in an unhealthy quarter of Glasgow, named the Goose-Dubs. She was taken to the cholera hospital on the 13th February, at noon. Her state was deplorable. The disease had attained its greatest height; the evacuations and the cramps, with which she had been violently affected, had ceased. The body was cold, notwithstanding the heating produced by laying her on a tin case heated by steam. The chest was the only part that retained warmth. The pulse had sunk, so



as to be scarcely perceptible in the right arm. The collapse was complete, and the treatment which she received entirely failed to improve her condition. She died at two in the afternoon. She had continually complained of pains in the epigastrium, even when no pressure was applied to that region.

The body was examined at nine in the evening.

The pericardium, pleuræ, and peritoneum, were without exudation, and in the natural state.

The heart empty and collapsed. It contained no gas. The right and left auricle half filled with coagulated black blood.

The lungs filled with black blood at their posterior edges only ; the other parts natural.

The liver pale, shrunk, as if wrinkled, and not at all injected. The gall bladder half filled with green bile. There was no bile in the dejections.

The intestines white, transparent, and containing little gas.

In the stomach, transparent and adhesive mucosities. The mucous membrane slightly injected.

The same substances in the intestines.

The mesenteric vessels, even the venæ cavæ, venæ portarum, and mesenteric veins ; the arteries, even the aorta, containing little blood.

*The two semilunar ganglia large, injected, red, and infiltrated ; shining and moist on their cut surfaces, although nothing flowed from them.*

*The nerves of the solar plexus tumid ; their neurilema red, and somewhat infiltrated.*

*The pulmonary and cardiac plexuses tumid and injected.*

The third case was that of a man named James

Philips, a labourer, aged twenty-three. He had been carried to the cholera hospital at Glasgow, on the 14th February, at eleven in the forenoon. The disease was then far advanced. The pulse was firm and full; the tongue red and dry on the edges, which are unusual symptoms. At seven in the evening, he fell into a complete state of collapse, and at five in the morning of the 15th he died. The body was examined at eleven.

The surface of the body cold.

Old adhesions between the two pleuræ.

Cadaveric sugillation at the posterior part of the two lungs; in all other respects, these organs were healthy and crepitant.

The pericardium natural, without effusion.

The right auricle of the heart full of black blood imperfectly coagulated.

Under the auriculo-ventricular valves, a dense mass of fibrin, of old formation, but free. The right ventricle collapsed, half empty. It contained only black and fluid blood. A hard and white mass of fibrin extended from the ventricle into the pulmonary artery. The left auricle and ventricle almost empty, and containing no coagulum.

The liver adhering to the diaphragm and viscera. The gall bladder contained a considerable quantity of healthy bile

The mucous membrane of the stomach injected and ecchymosed, covered with mucous matter, mixed in some parts with bile. It was not much softened.

The intestines did not contain air, and were not much injected at the outer surface.

In the upper part of the small intestine, a large quantity of white matter, tinged with green at intervals,



creamy, and of more consistence than the choleric secretions. Near the cæcum, this matter was paler, and similar to that passed by stool. In the whole mucous membrane of the small intestines, decided injections and ecchymoses of large extent; and near the cæcum, broad, granulated, hard patches, of a deep red colour, in consequence of injection of the vessels, as well as of deeper ecchymoses.

The large intestines in the healthy state, filled with choleric fluids.

*The pneumogastric nerves enlarged, but of a natural colour.*

*The solar plexus composed of thicker nervous bands, and of a red colour. Their neurilema injected. The sections which were made shewed the injected matter to be dense.*

*The two semilunar ganglia, especially the left, enlarged, injected, and softened.*

The mesenteric glands white and natural.

*The cervical part of the ganglionic nerve flattened in the form of a broad band.*

The urinary bladder empty, contracted, and hard.

The menigeal vessels gorged with black blood. At each cut made in the substance of the brain there issued a multitude of small bloody drops. The lateral ventricles contained an effusion of limpid serum.

In the vertebral canal, an effusion of four or five ounces of reddish serum.

The cortical substance of the brain denser than usual.

The fourth case was furnished by a child of seven years, named Mary Hardie. She was carried to the cholera hospital at Glasgow, on the 15th February, at



eight in the evening. Fifteen hours had elapsed since the commencement of the disease, and the child was then very severely affected. She died at two in the morning. The body was examined, on the 16th, at half after twelve.

The shrinking of the body was extreme.

Injections of the vessels of the dura mater and brain. The sections of the brain presented numberless bloody dots. Effusion of limpid serum in the ventricles.

The lungs charged with red blood, excepting their anterior edges, which were natural.

The right auricle and ventricle filled with fluid blood of a dark colour. In the same ventricle, a soft, vesicular concretion of fibrin.

The left auricle and ventricle almost empty of blood. A concretion of the same nature extended from the ventricle to the aorta.

The stomach and small intestines contained a creamy matter, of a grayish white colour, mixed with green at intervals, fluid, pultaceous, more liquid in the ileum, and not adherent.

In the large intestines a more liquid substance.

The membranes of the intestines healthy; the mucous coat without injection or softening, excepting in a single point near the ileum, where there were thickening and redness, without ulceration.

In the ileum, an intussusception an inch in extent, easily drawn out.

The liver healthy; the gall bladder half filled with green bile.

The urinary bladder empty and contracted.

*The semilunar ganglia thicker than usual, but white and not injected.*

*The solar plexus, and the renal plexus, somewhat injected.*

The lymphatic glands large, but healthy.

The fifth case was furnished by a man of the name of MacDermot, aged sixty-five years, who resided in the Goose-Dubs, at Glasgow. His son had died of cholera on the preceding night. He was admitted into the cholera hospital on the 16th February, at half after eight in the morning. His case was very severe, and was remarkable for the determination to the head, and especially the suffusion of the face and eyes, which at first presented nothing of the usual blue tint. The pulse was full, and the body warm, although the previous symptoms, and what took place subsequently, left no doubt of the disease being cholera. This man died the same night at twelve.

The body was examined on the 17th, at half after twelve.

Great shrinking of the body, although it was very muscular; veins swollen over the whole surface.

General adhesion of the pleuræ on both sides; most of them old, some recent.

The posterior edges of the lungs filled with blood; anterior, white and crepitating.

*The pneumogastric nerves visibly injected, and thick.*

The left ventricle full of black fluid blood.

The two auricles, and the right ventricle, contained a little blood of the same quality.

Very dense concretions of fibrin in the same cavities.

The right jugular vein enormous.

The vasa propria of the aorta injected.



The peritoneum of the stomach strongly injected, as well as that of the intestines.

The mucous membrane of the stomach injected, without ecchymoses. In the interior, a great mass of greenish serous fluid. In some points a green substance, precipitated, and attached to the mucous membrane.

Near the cæcum and ascending colon, numerous deep ecchymoses. In the interior, a greater quantity of fluids, similar to those in the stomach. Much air in the intestines generally.

*The solar plexus, and the semilunar ganglia, were enlarged and red.*

The renal plexus in the natural state.

The gall bladder full of bile of its natural appearance.

The liver in the ordinary state.

The urinary bladder contracted and hard, containing a few drops of urine.

The dura mater gorged with blood. A serous effusion in the arachnoid membrane.

The sections of the brain shewed vascular congestion, and softening of substance.

A very large serous effusion in the two lateral ventricles.

I shall not here communicate more anatomical researches, because they refer to other points of the question, which can only be considered as accessory, at least in comparison with those given. I would only direct your attention to the point which seems to me the most important, and which is the one that more especially interests us at present—the morbid state of the semilunar ganglia, solar and renal plexus, of the lower part of the pneumogastric nerves, and

sometimes even of the pneumo-cardiac plexus. These alterations, which had been anticipated by Loder, and which I and my companions have demonstrated by dissection, are rendered more important by the result of your investigations, undertaken at our request, and which have confirmed their existence. These researches are difficult, and are liable to be neglected amid the confusion always caused by a severe and extensive epidemic ; so that the progress of science, with reference to this point, might be retarded, were not this fortunate discovery to receive the necessary attention from individuals of sufficient authority. Your extensive knowledge and ardent zeal give me entire confidence. If there be an important truth in what we have seen, it will benefit science, on those unhappily too frequent occasions which at this moment offer themselves to the medical men of a country so advanced in civilization, since you have become sensible of its value.

The entire theory of the disease may be conceived by viewing the morbid alteration of which we here speak, in connection with the symptoms of cholera.

An intense, fixed pain, limited to a very narrow space, which corresponds exactly to the point of the linea alba, directly over the extremity of the ninth and sixteenth ribs, always precedes the manifestation of the other symptoms. You are aware, that this point corresponds exactly to the situation of the central point of the ganglionic nerve.

The diminution of the circulation is the first phenomenon that succeeds. There are, as yet, no evacuations ; the blood is still entire ; yet the arteries pulsate feebly, their diameter diminishes, and these weakenings of the circulating power at first manifest themselves



by alternations, corresponding to the transitory intensity of the epigastric pains, while, in the intervals, the pulse resumes strength and consistence. This phenomenon too closely resembles what takes place in strangulated hernia, or in peritonitis of any other kind, not to suggest the idea of a similar origin. In both cases, it is the ganglionic nerve that suffers, and the same influences may result.

An unusual and enormous secretion takes place along the whole alimentary passages. To supply it, the organs must have received a great impulse from the nerves on which they depend. Here still we are led to the ganglionic nerves as the certain source of the impression. Now, if this nerve be in a morbid state, is it strange that its functions should be vitiated?

A convulsive state manifests itself in the stomach and intestines. Now, you have just seen, and any one may verify the fact, that the lower part of the pneumogastric nerve is concerned in the affection, which is at first peculiar to the semilunar ganglia and their plexus.

The blood ceases to be *arterialized*; and this keeping up of the dark colour precedes the cooling of the expired column of air,—a phenomenon of a more advanced stage. But physiologists have long placed the liver at the head of the organs by which the blood is purified; as the solar plexus, common to the two ganglia, and which participates in their morbid affection, supplies the liver with the nerves by which it is animated, it cannot appear strange that the functions of this organ should languish or cease. Whether the abstraction of the principles of the bile contained in the blood, by the action of the liver, is the principal influence of that viscus with reference to the purification of the blood, or whether it contribute to this

purpose in any other manner, it is not the less remarkable that the venous blood passes through the region of the liver, without there undergoing any change; that the secretion of the bile ceases; and that, most commonly, the liver is found destitute of the full injection which constitutes its natural state.

The secretion of the urine ceases ; and we have just seen that the disease of the ganglia distinctly extends, in most cases, to the renal plexus. In those cases in which this circumstance is not so evident, there is nothing contrary to reason in the supposition of a morbid irradiation capable of producing the same effects.

The general temperature of the body is diminished first in the limbs and all the appendages ; but it remains in the trunk and viscera, as shewn by the thermometer, and, as might be presumed from the testimony of the patients, their intense thirst for cold drinks, and the relief which they experience from the internal application of ice, — as I have witnessed with my own eyes. Now, it is well known that the nerves of the ganglionic apparatus accompany many of the arterial vessels of the limbs ; that the temperature of the extremities is in the ratio of the intensity of the arterial circulation ; that in cholera the circulation diminishes and ceases first in the limbs, and particularly in the extremities. This phenomenon, which naturally supposes a diminution in the influence of the ganglionic nerves which accompany the arteries, is easily explained by the morbid state of the central point of that apparatus.

There can be no exaggeration in seeking in the same conditions, the immediate cause of the cramps.



They in fact keep pace with the progress of the disease, and of the abdominal symptoms.

One of the last results of this affection is the refrigeration of the expired column of air. Chemical analysis has shewn that from this moment there is no longer carbonic acid gas in the expired air. Now, if we do not admit the concurrence of the nerves of the pneumo-cardiac plexus for the combinations of which respiration is the medium, it cannot be conceived, why insufflation should not revive respiration in the dead body. Innervation has therefore ceased in the branches. Whence also the cessation of all chemical action in respiration, and the reduction of the expired air to the external temperature, as its proper constitution.

It appears quite reasonable to conclude, that, since the communications of the pneumogastric nerve with the ganglionic apparatus, are the probable cause of the extension of the disease of the latter to the contiguous portion of the former, this extension may, and actually does, reach the pneumo-cardiac plexus. The pulsations of the heart itself are seen to fail, at the period when the refrigeration of the column of expired air takes place.

This concatenation of physiological inductions would be of little interest were it not connected with a material and certain morbid condition. It is even of the greatest importance for the utility of what we have observed, that the first affection should be positively defined in its nature, as well as in its seat. It is, in fact, an inflammation; and this kind of alteration, in itself essentially important, tending to a rapid increase, affecting one of the principal apparatus of



the system, is more dangerous than in many other cases, both on account of the delicate and easily destructible texture of the organs concerned, and the necessity of their full and uninterrupted influence on the formation of the blood, nutrition, respiration, and circulation.

These considerations may, perhaps, lead practitioners to reflect on the advantage that might be derived, in cholera, from bleeding, when used at the commencement, or rendered possible and employed at a later period, by the preliminary use of exciting methods of various kinds.

They will, perhaps, enable them to perceive why either of these methods, used by itself, and without modification, has little or no success. Perhaps the same considerations may tend to shew why, in different places, and sometimes in places very near each other, during the continuance of the same epidemic, practitioners of equal respectability have been constrained by the result, some to bleed at the commencement, others to abstain from bleeding until the period of reaction.

I might infer from the same anatomical facts, and from some unusual circumstances, which cannot have escaped your notice, the necessity of varying the treatment according to certain complications, which these facts attest. Such an inference is so easily made by a mind so experienced and so enlightened as yours, that I shall refrain from adding by it to the already too great length of this letter. I shall, in conclusion, merely mention the importance which such observations must henceforth attach to anatomical researches, in the study of cholera. But you are sensible that these

researches can no longer be confined to the state of the membranes of the digestive apparatus, and the nature of the fluids which it contains. The inquisitive spirit of your countrymen had already directed them to investigate the state of the altered blood, and the chemical nature of the dejections. They had succeeded in discovering what is wanting in the one, and what occurs in the other. It is now the duty of anatomists and physicians to follow up these views, and search out the organic principle of this chemical dissociation. But in the present state of the question, it is easy to perceive that the mere superficial examination of dead bodies can be of no value.

To you, Sir, belongs the glory of having shewn to your numerous pupils what enlightened use they may make of their courage, in a public calamity, in which so much is expected from the zeal of the members of our profession.

I expect with impatience, and shall receive with gratitude, the luminous communications which you have had the goodness to promise me ; and

I remain,

SIR,

Your most obedient Servant,

DELPECH.



## CASE I.

*Feb.* 16, 1832.—8, P.M.—P. L——, aged forty, was seized this afternoon with vomiting and purging of fluid resembling rice water. At the commencement of the attack, he voided a little urine, but none since. His lips are blue; eyes sunk; countenance cadaverous; pulse very weak; hands blue, cold and shrivelled; arms cold. He is severely cramped in the legs, thighs, arms, and body; has been suffering from diarrhœa for two days; has had at intervals four pills, each containing two grains of calomel, two grains of camphor, and a quarter of a grain of opium, with a teaspoonful, every hour, of a mixture consisting of tincture of capsicum, ammoniated alcohol, and ether.

Injiciat. stat. enema aq. font. lb. 5. in quo sint, tabaci gr. xv, tinct. opii, 2 dr., aq. ammon. 4 dr. And every hour, two of the above pills, with a teaspoonful of the mixture, and occasionally brandy.

*17th.*—Ten pills taken. Has vomited none since he got the glyster, and since then the cramps have been also easier. Pulse imperceptible; tongue loaded, white, and dryish, and where uncovered, it is livid; breath cool; hands and lips blue; has voided a little urine.

One pill every two hours, with a teaspoonful of the mixture and brandy.

*Evening.*—Lips are blue; face of a dark livid colour; hands blue, and shrivelled: has been severely cramped in his hands and body; voice can scarcely be heard. Watery vomiting and purging continue. Voided a little urine at four P.M. Has taken four pills, and some of the mixture—Rept. enema tabaci.

*18th.*—Moribund. Died at two P.M.

*Post mortem Appearances, twenty-two hours after Death.*

*Brain and Spinal Chord.*—When the integuments and muscles were divided and reflected, in order to examine the brain and spinal chord, dark pitchy blood exuded from arteries and veins. On removing the skull-cap, the arteries of the dura mater were found turgid with the same kind of blood. On detaching the cervical vertebræ, the same dark blood and serum issued out in

considerable quantity. The veins on the surface of the hemispheres of the brain were turgid with the same blood, and resembled those in apoplexy. Slight serous effusion between arachnoid and pia mater, especially anteriorly. The superior longitudinal, and all the other sinuses, were distended with the dark blood. When the brain was bisected, it presented numerous dark bloody points, indicative of great congestion, and was very firm in its structure. The natural quantity of serous fluid found in the ventricles; their vessels highly congested, especially the velum interpositum of Haller. Carotids and vertebrales gorged with the dark blood. The basis of the cranium, and anterior aspect of spinal canal, full of vessels congested with the dark blood—every trifling vein a large sinus. Considerable serous effusion within the theca vertebralis. Veins on cerebellum and spinal cord in the vicinity of former organ, very numerous, and turgid with the blood. The same vascularity observable between the dorsal and lumbar regions of the chord. On tearing away the theca vertebralis from the vertebræ, the rachidian veins were turgid with blood, which, when pressed on, issued out like tar. Cerebellum peculiarly firm.

*Abdomen.*—The peritoneal surface of the intestines, especially the ileum, was studded with vascular patches; many points of this intestine highly vascular, and some approaching to a bluish green. A similar appearance, only more rosy, on caput cæcum and jejunum. Intestines throughout coated with viscid lymph, evidently albuminous. About a couple of ounces of turbid serum in pelvic cavity. Urinary bladder contracted and pyriform. Omentum rosy red colour in several places. Colon of its natural size throughout, and also the rectum; colon, near gall bladder, tinged with bile. There was the same offensive smell as in cases of peritonitis. Stomach of a rosy tint towards its pyloric orifice, with its blood-vessels arranged in patches. Mesenteric vessels moderately filled with the dark blood. Liver of natural colour; if any thing, inclining to yellow. Gall bladder very turgid with bile. Spleen natural.

Stomach—mucous tunic rugous studded with rosy maculæ, remarkably soft, breaking down under the fingers, with about four ounces of coffee-coloured fluid, as is seen in yellow fever. Duodenum filled with ropy, biliary fluid; the same continuous into jejunum, but becoming lighter and lighter along this viscus. Bile could be injected into duodenum by pressing on gall bladder. Bile, very dark coloured. Mucous tunic of jejunum studded with



inflamed patches of blood-vessels, and about the middle of this intestine the contents had a more feculent appearance. Ileum contained a dirty greyish-brown, or earthy coloured mucous fluid, and its mucous tunic was vividly injected, together with patches of ecchymosis. Colon contained same fluid as ileum; in many points highly injected with blood-vessels, particularly caput cæcum, with broad maculæ of effused blood; and its mucous tunic was particularly soft. Rectum containing same fluid as ileum and colon; and its mucous tunic, equally soft and vascular, and studded with many ulcerated patches, the same as in dysentery. Kidneys slightly softened, and a little turgid with blood; the cellular tunic of the right kidney presented a vascular arborescence. When this tunic was removed, the surface had a marled appearance, the vessels arranged in patches. Towards the lower apex, it was dark purple, approaching to gangrene. When bisected, blood issued out, and the whole gland was peculiarly soft. Liver—convex surface presented a similar marled appearance to kidney, and was peculiarly soft. Urinary bladder contracted, and contained two drachms of muco-purulent fluid; and its mucous tunic was highly vascular.

*Thorax.*—Pericardium thin and diaphanous, and resembled a dried bladder, and studded in some points with vascular patches. Heart—left ventricle empty, its walls slightly softened; left auricle filled with the dark blood, with a large fibrinous deposit extending into the pulmonary veins, and around ventral valves into the aorta. Right ventricle filled with the same blood, with a large fibrinous deposit extending into the pulmonary artery, and into the right auricle; the latter gorged with blood.

Aorta, from its sigmoid valves down to the iliacs and femorals distended with the dark blood. Vasa vasorum exceedingly numerous. Venæ cavæ gorged with blood. Cellular web of the æsophagus turgid with blood-vessels.

Lungs healthy,—and pleura also healthy, with the exception of that on the diaphragm on the right side, the vessels of which were distributed in patches.

*Nerves.*—Nervus vagus, on left side in cervical region, but particularly in the thoracic, had its neurilema studded with vessels, and most remarkable where it gives off the pulmonary plexus. The æsophageal plexus, of a bright rosy red. The blood-vessels of the neurilema of the splanchnic nerves in thorax were very distinct. On tracing the left into the abdomen, the semilunar ganglion

presented a bright rosy red, its neurilema being highly injected. The same vascular appearance was evidenced when bisected, and its vessels poured out blood when pressed upon. The neurilema of the recurrent nerve, also highly injected.

## CASE II.

*Feb.* 17, 1832.—8, P. M.—F. D——, about sixty-five years of age, was seized this afternoon, at four, with vomiting and purging; the evacuations reported to have been watery from the commencement of the attack. At present they resemble thin greyish gruel. She has little thirst; no spasms; and has voided no urine. The existence of any previous diarrhœa could not be ascertained. Is moribund.

Died at midnight, after eight hours' illness.

### *Post mortem Appearances, ten hours after Death.*

*Brain and Spinal Chord.*—On reflecting back integuments and muscles from nape of neck, in order to examine the spine, dark grumous blood flowed profusely from the occipital veins. On tearing the skull-cap from the dura mater, the arteries of the latter were found filled with the dark blood. The dura mater being incised, the veins on the hemispheres moderately filled with the blood. Considerable serous effusion between the arachnoid and pia mater. On incising the hemispheres, structure of the brain natural, with no particular vascularity. The lateral ventricles distended with serum. The choroid plexus contained many small vesicles.

Spine being laid open, the theca vertebralis particularly white and leathery like, and containing a considerable quantity of serous effusion. Slight turgescence of blood-vessels in the cervical, and between the dorsal and lumbar regions.. The arachnoid membrane studded in various places with white flakes of albuminous or ossific deposit, of old formation.

On taking out the brain, dark blood, somewhat thinnish, issued from the carotid and vertebral arteries. On removing the spinal cord from its seat, the anterior surface presented the same vascularity that was observed posteriorly.

On slicing the cerebrum and cerebellum, the latter felt a degree softer than the former.



*Abdomen.*—On first inspection, every thing appeared natural. Ileum and colon whiter than natural. Colon contracted from the commencement of its transverse arch downwards to the rectum; and the rectum itself also contracted; urinary bladder also contracted, and resembling in shape an inverted uterus; the fundus looking sacrad, and the mouth pubic.

Liver, natural; gall bladder, two-thirds filled with bile; stomach, blanched, as if boiled; spleen, natural.

Stomach, when laid open, partially filled with thin, gruelly looking fluid. The mucous tunic presented the rugous pentagonal folds strongly developed, nearly as much so as the omazum in the cow, with slight efflorescent patches. This tunic adhered but slightly to the subjacent tissue; pancreas natural; mesenteric veins not distended; duodenum containing the same gruelly fluid that was observed in the stomach; the mucous tunic thickly coated with adhesive mucus; the tunic itself easily removed from the subjacent tissue. *Gall bladder.*—On being pressed, the bile contained in this viscus was readily ejected into the duodenum; the bile of its natural amber colour, and limpid. Jejunum contained the same fluid as in the duodenum, and its mucous coat presented the same characters. Ileum contained a large quantity of fluid, thinner than in the other intestines, and more like rice water; its mucous coat adhered much more firmly. *Colon.*—Caput cæcum, and ascending portion, distended with thin gruelly fluid. The transverse arch, sigmoid flexure, and rectum, which, *in situ*, appeared contracted, admitted of easy distension when removed from the body, from the gravitation of the gruelly contents. Vena cava contained a moderate quantity of dark blood; spleen bisected, presented nothing unusual; liver, on being cut into, presented no engorgement, and the biliary ducts could be distinctly traced, from their containing bile; kidneys, when bisected, paler than natural; bladder contained about two drachms of fluid; the internal coat rugous.

*Thorax.*—On first inspection of this cavity, the lungs and heart appeared natural, but, on examining the cavities of the pleura, particularly the left, there was found some recently effused coagulable lymph. Left cavity of thorax contained about two pounds and a half of turbid serum. Right side contained about four ounces.

*Heart.*—Right auricle and ventricle collapsed, and containing a small quantity of the dark blood, with some fibrin in the former.



Left ventricle contained no blood; left auricle a little of the blood, and with fibrinous deposit.

Lungs, when cut into, perfectly healthy; no congestion.

On slitting open the aorta, dark blood was found; and, beyond the left subclavian, a large fibrinous deposit, extending along about nine inches of the vessel. The same dark blood found in all the abdominal arteries, in the common, external, and internal iliacs, and in the femoral and brachial arteries.

*Nerves.*—The splanchnic nerves on both sides were traced to their junction in forming the great solar plexus; the left semilunar ganglion of which had a reddish tint, which was found to pervade its structure, while that of the right side, together with the other ganglia, was pale, both externally and internally.\*

### CASE III.

M. P——, aged sixty, given to dissipation, was first seen about eleven o'clock A.M. of Friday, 9th March, 1832, affected with malignant cholera, of which she died about seven o'clock in the same evening.

#### *Sectio Cadaveris, fifteen hours after Death.*

When the body was undressed, it was very stout; the skin presented, in many points, even the most elevated, a marled appearance of blue and white, evidently not the effect of gravitation, and it felt warmer than an hour before death.†

*Brain and Spinal Chord.*—On incising the integuments and muscles, to examine the brain and spinal chord, the muscles were of a dark colour, and turgid, with vessels pouring out dark black blood. When the theca vertebralis came into view, the veins were found turgid with the same blood. No effusion in spine between the vertebral column and the theca vertebralis. On removing the skull-cap, the blood-vessels of the dura mater were turgid with the dark blood. The dura mater being inadvertently punctured at the

\* I am indebted to my esteemed and talented friend, Mr Steele, surgeon, at Craighall, for this and the preceding case. I conducted the dissections myself, and devoted some hours to each.

† One patient was placed on her face, half an hour after death, and, as far as regards the congestion of blood-vessels, the same appearances, on the skin, brain, and spine, as in the others, were observable.

atlas, much serous effusion poured out. The blood-vessels of the dura mater were turgid with the dark blood. The superior longitudinal sinus contained little blood, but this became more and more profuse towards the lateral. When the dura mater was reflected off, there was a little serous effusion under the arachnoid membrane, particularly anteriorly. The blood-vessels of the pia mater were natural. The head being depressed, the blood rushed in great quantity out of the incised lateral sinuses and veins of the neck. The pia mater of the spinal chord was congested with the dark blood. In the lumbar region, there was a great quantity of serous effusion; and the blood-vessels going out of the spinal canal, along the individual nerves, were much enlarged. A few patches of lymph were observable on the surface of the arachnoid, on the cerebrum. The brain, when incised, presented pretty numerous red dots, shewing a good deal of vascularity. The arachnoid membrane, covering the lateral ventricles, appeared thicker and tougher than usual; and there was rather more than the usual quantity of serous fluid in these cavities, the vessels of which were nearly natural. The choroid plexuses were blanched, but the vena galeni turgid. The cerebellum was softer in consistence than the cerebrum.

When the brain was removed, the sinuses at the base were not very conspicuous, much blood having escaped.

On separating the nerves forming the cauda equina, the neurilema of each small nerve was vividly injected; and, on tearing away the theca vertebralis, the rachidian veins were turgid with the dark blood.

*Nerves.*—On tracing the eighth pair of nerves down the neck, there was slight injection of neurilema observed. On tracing the sympathetic nerve in the neck, its neurilema was in the same condition. There was injection of the pleura, investing the pericardium and the phrenic nerve; when the pleura was removed from the nerve, the neurilema presented the same injected appearance; and the neurilema continued injected all the way to the diaphragm. The sympathetic nerve, on the left side of the neck, with its inferior ganglion, was tumid, and its vessels vividly injected. The cardiac plexus was very vividly injected. The posterior mediastinum was injected. On tracing the nervus vagus into the posterior mediastinum, it was found also much injected, and was equally distinctly injected in the formation of the pulmonary plexus. The œsophageal plexus was injected, and the vessels



of the œsophagus itself injected. On tracing the sympathetic along the heads of the ribs, its neurilema was vividly injected, especially at the respective ganglia; but most, however, at the seventh, where it began to give off its contributions to form the splanchnic nerve. This ganglion, when bisected and squeezed, gave out small drops of blood. The ninth ganglion appeared very dark; and, when removed and bisected, it was found to contain ecchymosed blood. When the splanchnic nerve was traced into the abdomen, its neurilema was still more injected, and its semi-lunar ganglion of a ruddy colour, and the filaments originating from it were also injected.

When the pleura was reflected off, the nervus vagus was spread out like a broad band, in consequence of its vessels being so numerous as to run down between its respective filaments, but particularly where it began to give off the pulmonic plexus, the filaments of which were very much injected. The œsophageal plexus, on its approach to the diaphragm, was still more injected. The splanchnic nerve was in the same condition as that of the opposite side,—its sixth, ninth, and tenth ganglia being most conspicuous, and it continued vividly injected towards the abdomen; the neurilema of the ganglion being less injected than that of the left side. The whole solar plexus was more or less injected.

*Thorax.*—On the right side, the mediastinum was fully injected, particularly at the roots of the lungs. The lungs were healthy, there being less congestion at the posterior aspect than ordinarily. The heart was flabby and collapsed,—its right side being partially filled with the dark blood, its left side having also the dark blood, with coagula in the pulmonary veins, and a small quantity in the left ventricle. The pulmonary artery, traced into the lungs, was partly filled with the dark blood.

*Abdomen.*—The vessels of the small intestines presented a delicate red tint—white, where the intestines were applied to each other; and the intestines, when freely handled, felt soapy, as if covered with albumen; and the hands, on drying, felt as if covered with glue.

The small intestines throughout presented a delicate rosy red; the large intestines the same appearance—and all of them were of their natural calibre. There was the same soapy feeling of pleura as of peritoneum.

Liver, when bisected, exhibited the yellow deposit of Bright.

The stomach was rather of a white colour externally, and

partially distended with gas, and contained a light brown, or earthy coloured fluid. The mucous tunic softened, and tinged here and there of a brown colour. The pancreas was healthy, and, when bisected, was turgid with the dark blood. The duodenum, when opened, presented a pallid appearance, containing a gruel fluid. On pressing the gall bladder, which was moderately distended with bile, it flowed into the duodenum. The jejunum the same as the duodenum. The fluid in the ileum resembled panada, slightly tinted with port wine. The colon was filled with red watery fluid. The glands of Brunner largely developed. The kidneys, externally, slightly vascular, and slightly congested internally: the left kidney more congested than the right. The spleen healthy, only a little larger. The urinary bladder contracted, and of a pyriform shape, and contained a little muco-puriform fluid, but no urine. The blood was fluid in the femoral and brachial arteries; and blood was found in the vena cava and mesenteric vessels.\*

#### CASE IV.

*February 24, 1832.*—9, A.M.—Mrs M——, about forty years of age, had been complaining of diarrhœa for thirty-six hours. Was attacked this morning with griping pains in the belly, and spasms in the feet and legs. Copious dejections of light brown watery coloured fluid, mixed with flocculent matter. Voided her urine about an hour ago. Great sickness, with inclination to vomit. Thirst urgent. Skin warm. Pulse 84, little affected. Took calomel, gr. x, colocynth, gr. v, gum. opii, gr. ij; had mustard poultice to abdomen, turpentine frictions to the legs, and assiduous application of external heat.

1, P.M. — Countenance livid. Eyes glazed, and turned up. Pulse 100, and scarcely perceptible. The hands blue and cold. Thirst urgent; and every thing vomited. No evacuation *per anum*. Much cramped in feet, legs, and thighs. Severe spasms are also felt about the jaws, throat, and neck. The tongue livid and loaded. No urine. A vein of arm opened, and only eight ounces of dark blood obtained. Two injections of hot water, — the first at

\* For this case I am indebted to my intelligent friend, Dr Thomas Sanders. I conducted the dissection myself, in presence of him, Dr Dunbar, and Mr Lawrie, and devoted several hours to it.



five, and the second at ten o'clock. First injection retained for half an hour. Calomel, gr. xx. by the mouth; opium, gr. iii. *per anum*. A quantity of potass in powder, applied to the nape of the neck, and flannel dipt in boiling water, to the region of the stomach.

*Feb. 25.*—10, A.M.—Skin cold. Hands blue and shrivelled. Countenance blue. Eyes turned up. The breath cool. Tongue livid. The belly pained on pressure, which excited violently the tetanic symptoms of the muscles about the jaws, throat, and neck. Feels a deep seated pain in the lumbar region. A small dejection, about six ounces of bloody yellow, or cream-coloured fluid, resembling pus, tinged with blood, with an offensive putrid odour. She vomits every thing she takes. Thirst urgent. Pulse imperceptible. Spasms in legs and feet. Potass to belly and lumbar region of spine. Potass allowed to remain for an hour.

6, P.M.—Skin of body and legs of natural warmth. Pulse distinct at the wrists, and 100 in number.

10, P.M.—Pulse still more distinct, and 100. Heat of the body natural throughout. The lips natural. The lividity of the face had disappeared. Other symptoms the same. Calomel, gr. x, opii, grss. in powder.

*Sunday, Feb. 26.*—10, A.M.—No pulse, even in carotids. The skin of natural colour, particularly that of the countenance; but warm and clammy, and presenting a marled appearance of arms and hands,—indications of cessation of capillary circulation. The tongue almost natural. The eyes turned up. Dejections as yesterday. Continues to vomit every thing she takes. Complains of the pain made by potass at the nape of the neck, and of deep seated pain in lumbar region.

She became worse and worse, until six o'clock of the evening of the following day.

### *Dissection, fifteen hours after Death.*

*Thorax.*—Pleura healthy. Lungs natural, but dry, where it covered the pericardium. The pericardium dry, and resembling paper, and injected with blood-vessels, and extremely red. No serum within. The heart flat, and the coronary vessels injected. The right side filled with blood, partly liquid, and partly fibrinous. The left ventricle contained a small quantity of dark fluid blood and small coagulum. Left auricle empty. The venæ cavæ gorged

with dark blood, even to the internal jugulars. The cellular tissue of aorta injected. Aorta contained a little dark blood.

*Abdomen.*—Vena portæ almost empty. Liver pale and flabby, especially its right half; when bisected, almost void of blood. Gall bladder full of bile. Peritoneum dry, injected, and ruddy, and covered in several points with light coagulable lymph. Small intestines inflamed, and very red in colour. The mucous tunic having various ecchymosed spots, softened in several points. The stomach and large intestines pale and uninjected, and as if boiled, but not softened: they contained a fluid of a greyish, or earthy colour. The stomach contracted. Spleen compressed, and void of blood. Urinary bladder contracted, and contained a drop or two of urine. The kidneys and pancreas natural.

*Nerves.*—The pneumogastric nerves and their distribution red and injected with blood-vessels, particularly where the right unites with the solar plexus, the ganglia and filaments of which were inflamed and softened. The cardiac and pulmonary plexuses red, and highly injected, but firm.

This woman had laboured long under organic disease of the uterus, and was affected with leucorrhœa. The catamenia were lately always menorrhagic.\*

## CASE V.

J. H——, thirty-six years of age, had been complaining of diarrhœa for five days past, (being attacked on Sunday last,) and was seized at six o'clock this morning, Thursday, March 1, 1832, with vomiting and purging, which soon became very severe, and terminated fatally about eight o'clock on the evening of the same day. He had made no urine since the preceding night about eleven o'clock. He was seen first at four P.M., when he complained of most acute pain in the epigastric region, aggravated on pressure, and accompanied with slight headach and drowsiness. The skin of the trunk warm, but that of the hands cold and livid; his countenance was sharp and anxious; his eyes suffused; the tongue moist, but furred in the centre, and of its natural colour at the tip and edges. Pulse weak at wrists, and only 72, but pulsation stronger in region of heart and carotids. He was ordered a

\* For this case I am indebted to Mr Steele at Craighall.



mustard poultice to region of stomach, and half drachm doses of aromatic spirit of ammonia every three hours.

*Appearances on Dissection, eleven hours after Death.*

*Brain and Spinal Chord.*—When integuments of head and spine were reflected, the dark blood flowed profusely.

On sawing cranium, the sinuses were accidentally wounded, and much blood flowed.

Slight serous effusion between arachnoid and pia mater, the latter membrane highly injected, and the veins on the convolutions tinged with the dark blood. Considerable serous effusion in basis of brain and in spinal canal. The brain, when incised, exhibited marked vascularity, and there was a little more than usual quantity of serous fluid in ventricles.

Muscles of spine rigid and dark coloured, and full of dark blood. Blood-vessels of spinal chord and canal highly congested. Arachnoid membrane studded with several white flakes of albuminous or ossific deposit, of old formation. The blood-vessels of spinal chord more congested anteriorly than posteriorly. In the lumbar region of the spinal canal, a profuse quantity of serous fluid, both within and without the arachnoid membrane. The sinuses of brain and rachidian veins of spine gorged with blood, and also the blood-vessels of spinal chord accompanying the spinal nerves.

*Thorax and Nerves.*—The pleura highly injected; lungs and pericardium natural; right side of heart contained less of the dark blood than the left; the pulmonary veins distended; a small coagulum in right ventricle; left phrenic nerve healthy; the cellular tissue in vicinity of left pneumogastric nerve highly injected, and also its neurilema, especially the pulmonic plexus; the substance of the nerve firm; the splanchnic healthy, from its origins to the semilunar ganglion, and to left half of solar plexus. While the origins of the right splanchnic (although the pleura was less injected on this side than the opposite,) were highly vascular, yet the nerves and neurilema continued pale and natural, until it formed the semilunar ganglion, which was slightly injected, both in its tissue and neurilema; and the nervous threads proceeding therefrom to form the solar plexus, but particularly those extending to the supra renal capsule, were very vascular, evidently inflamed from the appearance of patches. The pneumogastric nerve healthy.

*Abdomen.*—The peritoneum, in many parts, especially where it envelopes the small intestines, of a livid colour, while, in other parts, injected with blood-vessels in patches, and of a bright red; liver of a



yellow colour; gall bladder distended with bile; omentum highly injected, and of a red colour; stomach white; colon white; bladder contracted; kidneys lobulated, and of a livid blue colour; stomach, when opened, presented its mucous tunic rugous, with many vascular patches and ecchymosed points, and softened in its tissue. It contained some solid ingesta; duodenum very vascular; its mucous tunic of a deep red purple, with extensive ecchymosed patches. The duodenum contained viscid yellowish or cream-coloured fluid.

When the gall bladder, full of bile, was squeezed even forcibly, no bile flowed into duodenum; but, on dividing the duct about its middle, bile escaped, which was inspissated.

The jejunum the same as duodenum.

The ileum fully more vascular and inflamed than jejunum or duodenum, and contained bloody viscid fluid, resembling panada with port wine.

*Colon.*—Its mucous tunic less vascular and having fewer ecchymosed patches, and distended with gas. Urinary bladder, very thick, and containing a few drops of a flocculent fluid almost mucopurulent. The kidneys, externally, were of the same colour as the spleen.\*

## CASE VI.

*March* 11, 1832.—Mrs J. C——, aged fifty-eight, of dissipated habits, was seized at nine o'clock this morning with severe cramps in legs and arms, accompanied with violent vomiting and profuse diarrhœa, great thirst, and coldness of extremities; in which state she continued until two o'clock P.M. In addition to the above symptoms, she had blueness of the face, hands, and nails; skin of hands wrinkled; pulse imperceptible at wrists and ankles. A vein was opened in the arm, but blood could not be obtained in a stream—only six ounces were abstracted; a large mustard sinapism to spine, and about two ounces of whisky toddy were given.

At half-past five P.M. Complains of great thirst; general

\* This dissection was performed with dexterity and neatness by my young friend Mr Fearn; and I am indebted to the liberality of my scientific colleagues of the Drummond Street Hospital for its insertion, together with that of the case.

uneasiness; cramps in arms; slight cramps in legs; hands and feet cold; hands particularly shrivelled and blue; countenance collapsed; pain in back; pulse imperceptible at wrist or bend of arm; no vomiting or purging.

To have warm spiced wine and water occasionally; legs and arms to be well rubbed with a mixture of oil of turpentine and ammonia.

Six o'clock.—Pulse still imperceptible; complains much of thirst; very restless; great pain in back; has neither vomited nor purged; has retained the wine. Let her have immediately three grains of calomel and six of rhubarb, and continue it every hour until her bowels are opened; large mustard poultice to spine.

Eight o'clock.—Pulse occasionally perceptible, fluttering; countenance more collapsed; eyes more sunk; less restlessness, but complains much of thirst; has cried out for air once or twice; no dejections; the wine, which was repeated, is retained, as well as about a pint of warm gruel, which she took at different times; no urine; cold sweat on face. A turpentine injection immediately; Cont. Pulv. A dose of castor oil about twelve, if necessary; repeat sinapism to spine, and apply a large one to abdomen.

Ten P.M.—A short time previous to the administration of the enema, she passed a small quantity of reddish coloured fluid; she has attempted occasionally to raise herself up suddenly in bed. Countenance not so collapsed as at last report; hands continue cold and shrivelled; forehead warm, but lower part of face cold, and covered with a clammy sweat; body and feet warm; much external irritation, produced by the sinapisms; complains constantly of pain in back and belly; voice stronger; pulse can be felt, small, and very compressible; slight cramps in legs; has taken the powders regularly, but they have produced no effect; no urine; is restless, and complains of being hot. Continue powders and frictions.

An hour after last report, vomited about half a pint of fluid, which, on examination, appeared to be the gruel that had been given her occasionally. As she complained greatly of pain in back and abdomen, the sinapisms were removed.

Twelve, midnight.—Is much the same as at last report. She has occasional retchings, and vomits a little; the matter vomited is only what she takes to allay thirst; has passed a very little urine; bowels not moved. Continue as before; apply mustard poultice to abdomen; give another injection.



12th.—One A.M.—Has become very restless; no pulse at radial or brachial arteries; complains greatly of belly; passed about a pint of fluid from bowels, resembling water in which fresh meat had been washed, and containing flocculi. Two tablespoonfuls of strongly spiced wine every quarter of an hour; continue frictions.

From this period she began to sink rapidly, became very restless, turning from one side to the other incessantly, and looking wildly about; body and feet continued warm, but her hands and arms were cold and very blue; almost constant retching, with occasional vomiting of watery fluid; respiration quick and laborious; a convulsive shutting of the lower jaw took place from time to time, and she died at half-past two A.M.

*Dissection, twelve hours after Death.*

*Head.*—Meningeal arteries somewhat distended with dark coloured fluid blood. Very considerable serous effusion between the arachnoid and pia mater. Veins of pia mater much engorged with dark coloured blood, and considerable arborescent vascularity on the surface of the convolutions. No unusual quantity of serum in ventricles; arteries at the base of the brain much distended with black blood.

*Spine.*—A considerable quantity of serous effusion within the theca vertebralis. All the vessels ramifying upon the chord and upon the origins of the nerves accompanying the latter out of the canal, filled with darkish coloured blood: this appearance was most remarkable between the dorsal and lumbar regions. Rachidian veins much distended with black blood.

*Abdomen.*—Minute injection of peritoneal vessels, particularly in the neighbourhood of the bladder; numerous red spots on its surface, two or three ounces of turbid serum, mixed with flakes of yellowish lymph, in the pelvis. Small intestines moderately distended with greenish semi-fluid matter: stomach externally whitish, contained a good deal of white fluid with flakes; its mucous membrane much softened and easily scraped off, and upon its surface a large patch of ecchymosis; large intestines much contracted, and could not be distended by insufflation; bladder contracted and empty; liver of a pale yellow colour; vessels somewhat injected; its surface in several places had a puckered appearance; gall bladder large and distended with green bile, which by pressure could be forced



into intestine; right kidney sacculated, otherwise healthy in structure.

*Chest and Nerves.*—Old adhesions of pleura, its vessels generally minutely injected; intercostal veins much engorged with black blood. Sympathetic nerves in chest and par vagum of healthy appearance; semilunar ganglion of left side of the same colour as the crus of the diaphragm; that on the right red, but rather paler than its fellow; the other ganglia entering into the formation of the solar plexus, as red as the semilunar of the left side; and the filaments proceeding to form the right renal plexus were arranged into two bundles, and so red as to be at first mistaken for arteries; vasa vasorum of aorta and pulmonary artery, much injected; right auricle and ventricle contained a large fibrinous clot; the ventricle flabby and somewhat softened; small clot in left auricle; left ventricle exceedingly contracted, hard, and its parietes about an inch in thickness; it contained about a drachm of black blood. Left auriculo-ventricular opening would scarcely admit the introduction of the little finger.

Arteries of lower extremities filled with black blood; those of the upper but little distended.\*

## CASE VII.

*March 4, 1832.*

S—— A——, aged 50, ten A.M. was attacked with dysentery, in November, 1831; and since that period his bowels have never perfectly recovered their tone. Last night his stools became more relaxed than usual, and about five this morning there came on a vomiting and purging of a thin gruelly fluid, accompanied with spasms in the feet and legs; his hands and arms are now cold; pulse very weak, about 130; tongue white and moist; features pale and contracted; knees cold; has urgent thirst, and whatever he drinks is immediately vomited; frequent dejections of thin gruelly fluid, with occasional spasms in the lower extremities, and severe pain across the epigastrium, extending back to the spine; has voided no urine for several hours. Hab. quampr. calomel. 1 scr., adhib. enema aq. calid in quo sit infus. fol. tabaci. gr. xv.

\* This dissection was conducted by Mr Fearn.

Two P. M. About six pounds of water were thrown into the intestines, and retained for half an hour, and since the clyster came off has had no dejection; vomiting continues; no spasm; pulse scarcely perceptible; pain of epigastrium much complained of. App. sinapism. parti dolenti. Let him have a little brandy in warm water occasionally, and external heat be assiduously applied.

Six P. M. Is now much weaker; speaks only in a whisper, breast cold, lips and tongue are livid and cold, no vomiting. Rep. submur. Hydr. 1 scr. R. Tinct. Opi. 2 dr. Capsici. Spt. Æther. Nitr. ā ā 3 dr. Sumat. 1 dr. omni semihora ad quartam vicem.

Ten P. M. Moribund.

March 5. Died at ten A. M.

*Post mortem appearances, six hours after Death.*

*Abdomen.*—Upon opening the abdomen, the omentum was observed, on its anterior aspect, and particularly on the right side, to present a considerably reddened appearance; elsewhere, its veins were tinged with dark blood. Stomach much distended; its external appearance natural. Liver natural. On the omentum being lifted up, the colon was observed contracted; the small intestines, particularly the duodenum and jejunum, somewhat vascular. Gall bladder about two-thirds filled with dark olive coloured bile; spleen shrivelled and softish.

Stomach contained a large quantity of gas, and about six ounces of grey flocculent gruelly fluid; the internal coat pale and eroded; with here and there, particularly above the cardiac orifice, patches of tenacious coffee-coloured matter adhering to it. The small intestines contained throughout a small quantity of pale reddish coloured water, of a slightly sanguineous appearance; their coats felt thickened, the internal tunic soft, and presented in a few places marks of slight congestion, but was generally pale, and throughout lined with a viscid greyish coloured substance of the consistence of thick cream. Colon contained a considerable quantity of dirty brownish grey gruelly fluid; internal coat particularly pale. Rectum much thickened in all its coats; the internal one highly ecchymosed, and ulcerated. Kidneys healthy; no congestion; urinary bladder contracted and empty. Liver exhibited no change of structure, or any unnatural appearance.

*Thorax.*—Lungs, collapsed and dark coloured; exhibiting no marks of sanguineous congestion; the superior portion of both lobes tuberculated.



Pericardium, of natural appearance, contained a very little serum.

Heart, small, natural, and all its cavities empty, excepting the left ventricle, which contained a fibrinous deposit extending into the aorta. It is proper to remark here, that, previous to the examination of the heart, a considerable quantity of blood had escaped from wounds made in the superior and inferior cavæ. The superior surface of the diaphragm over the liver had its vessels highly and beautifully injected.

*Nerves.*—The phrenic nerve on both sides traced from the origin in the neck, and presented no unusual appearance; in the thorax on the right side the fibrillæ were parted about two inches by a blood-vessel.

The nervus vagus on both sides presented no appearance of vascularity in its trunk, but all the plexuses, into the formation of which it enters, were highly vascular; this was particularly remarkable as regards the pulmonic plexus; on the left side it was very highly injected.

The splanchnic nerve on the right side presented a highly vascular spot, about an inch and a half above the solar plexus; the left semilunar ganglion of a reddish hue throughout, on the right side of a pale greyish colour.

The solar plexus natural.\*

## CASE VIII.

W. J——, twenty-five years old, had a severe attack of cholera, which lasted three days. He was seen in state of collapse, and died 29th February, and examined two hours after death.

*Brain and Spinal Chord.*—The whole venous system of the brain gorged with the dark blood; the pia mater injected, and of a highly red colour throughout; the substance of the brain, healthy; ventricles, also natural; the tunics of the spinal chord, the same as those of the brain; the spinal chord, inflamed, particularly between dorsal and lumbar regions. At the last dorsal vertebra, the inflammation extended some distance into the substance of the spinal chord.

*Thorax.*—The right side of the pleura presented old adhesions; the left side natural; lungs natural; pericardium natural; heart pale and flabby; right auricle and ventricle, and venous system in

\* For this case, and dissection, I am indebted to Mr Steele, at Craighall.



general, gorged with dark blood, partially coagulated. The left side and arterial system, empty.

*Abdomen.*—The liver, the spleen, pancreas, and kidneys, natural; urinary bladder, contracted, and empty.

*Nerves.*—The pneumogastric nerve, natural. The pulmonary and cardiac plexuses, natural.

The solar plexus and semilunar ganglion, red, injected, and inflamed, but not softened. When bisected, glistening, and no blood flowed.

### CASE IX.

M. C——, eight years old, was attacked with severe cholera on the 15th February, for which she was bled, and much relieved, but always experienced acute pain in epigastric region for four days afterwards; and, on the 22d, the symptoms returned in a more aggravated manner than at first, and ran into collapse. She died on the 24th, at two o'clock in the morning.

#### *Dissection, ten hours after Death.*

*Abdomen.*—Peritoneum and intestines, injected; the intestines distended with gas; the mucous membrane injected and ecchymosed, especially in the small intestines; only one ecchymosed spot in stomach; stomach and large intestines filled with white flocculent fluid; the liver pale and flabby; gall bladder full of bile; pancreas, spleen, and kidneys, natural; urinary bladder contracted and empty.

*Nerves.*—Solar plexus inflamed, the redness intense; plexus softened and pulpy, crumbling under the fingers; the semilunar ganglia red and injected, but not softened; when bisected, no blood flowed.\*

### CASE X.

T. B——, aged five and a half years, was first seen February 26, half-past ten P.M. States he was attacked this forenoon at eleven o'clock, while taking his porridge, with vomiting and

\* I am indebted to Dr Coste for this and the preceding case and dissection.

purging, which have continued up to this time ; great coldness and lividity of the surface ; no pulse perceptible at wrist. In the afternoon complained of pains in the epigastrium. Half-past twelve.—Has had sinapisms applied to the abdomen and feet, and a small quantity of mulled wine at intervals. Two hours afterwards, the pulse became perceptible at the wrist.—To have a blister applied to the spine, and a sinapism to the abdomen.

Half-past eight. Died.

*Dissection, twenty-nine hours after Death.*

*Spine.*—On removing the integuments and muscles from the back of the neck and head, much very dark coloured blood escaped from the divided vessels ; all the veins within the spinal canal were exceedingly engorged with black blood, and presented a very beautiful and intricate network of vessels. There was considerable serous effusion beneath the theca vertebralis, and between the arachnoid and proper membrane of the spinal marrow.

*Head.*—Calvarium exceedingly vascular ; vessels of the dura mater much engorged with black blood ; all the sinuses filled with dark coloured blood, and in the superior longitudinal, a large fibrinous coagulum ; vessels of pia mater highly injected ; arachnoid membrane had a dry appearance, no effusion between it and the pia mater. Brain generally of a dark colour, and exhibited numerous bloody points when cut into ; no effusion into the ventricles ; arteries at the base of the brain turgid with black blood.

*Chest.*—Pleuræ of both sides highly injected, particularly at the roots of the lungs ; no effusion either into the bags of the pleuræ or pericardium ; coronary arteries much injected ; right side of the heart contained black blood, and a large fibrinous clot ; in the left side, very black blood, and a small clot of fibrin ; vasæ vasorum of aorta and pulmonary artery, much injected.

*Nerves.*—Par vagum, splanchnic, and semilunar ganglion on each side, examined, but no very unusual appearance observed in them, except that the small vessels supplying them partook of the general injection ; lungs of rather a dark colour.

*Abdomen.*—Intestines, generally appeared bleached, and were moderately distended ; mucous membrane of stomach granular, and so much softened as to be quite pulpy. In various parts of the alimentary canal, patches of incipient ulceration, and the mucous follicles every where large and conspicuous ; slight enlargement of mesenteric glands ; bladder contracted and empty ; liver



studded with yellow spots on its surface and in its interior; left lobe, of a pale clay colour, and numerous red spots on its under surface; gall bladder, distended with green bile; no apparent obstruction in its ducts; no bile in intestines; kidneys, both affected with Bright's disease; aorta and cava, and all the large vessels of abdomen, filled with black blood; all the arteries of the extremities filled with dark coloured blood.\*

## CASE XI.

*Thursday, February 16, half-past one, A.M.*—G. E——, aged forty-six, was attacked yesterday at two, P.M. with pain in the epigastrium, and purging of white matter, which continued till midnight. At 9, P.M. forty drops of laudanum were given by his wife, and subsequently an injection, containing two teaspoonfuls of laudanum. Said to have been quite well previous to the attack. Surface cold, and of a dark blue appearance. No vomiting up to this time, when the respiration became laboured, and the pulse in the extremities imperceptible. In a few minutes, his jaw dropped, and he was unable to swallow some cordial mixture that was offered to him. The extremities continued cold and blue; and he died, without having exhibited any signs of sensibility.

### *Dissection, five hours after Death.*

*Head and Spine.*—On removing the calvarium, much dark coloured blood issued from the vessels of the dura mater. Some slight effusion of serum between the membranes. The vessels of the pia mater much gorged with black blood, as were also the arteries at the base of the brain. No unhealthy appearance of the spinal marrow or its membranes. Several ounces of black fluid blood flowed into the skull from the spinal canal, apparently from the divided vertebral arteries. No unusual quantity of serum in the ventricles.

*Abdomen.*—Stomach of rather a pale colour, and very much distended with flatus and the white fluid. Its mucous membrane had a granular appearance, was much softened, and could be easily peeled from the subjacent tissue. The small intestines contained a large quantity of red-currant-jelly-looking matter,

\* This dissection was conducted by Mr Fearn.

mixed with white flakes, such as are seen in the fluid vomited. Their inner surface exhibited numerous red points; and the mesenteric vessels, even to their minutest ramifications, were filled with dark coloured blood. The descending colon, sigmoid flexure, and rectum, were much contracted, as was also the lower ends of the ileum; the bladder contracted and empty; kidneys of a darker colour than natural; no bile in the intestines. Gall bladder three-fourths full of dark green bile, which, by pressure, could be easily forced into the duodenum; liver somewhat engorged with black blood; the abdominal aorta, vena cava, and iliac arteries, filled with very dark coloured blood; femoral artery contained black blood, and a string of fibrin; the brachial artery was much distended with black blood, so that, when exposed, it looked like a vein.

Upon farther examination, small patches of ulceration were found upon the mucous membrane of the jejunum and ileum.

*Chest.*—Coronary vessels of the heart much injected; a large fibrinous deposit in the right auricle, extending to the ventricle; left ventricle contained a large quantity of black blood, and a small clot of fibrin; some reddish frothy matter in the trachea; several ecchymosed spots found upon the aorta, near the heart; one of these spots involved the anterior coronary plexus of nerves; the vasa vasorum of the aorta were much injected.

*Nerves.*—The cardiac nerves, on the back of the aorta, had a vascular appearance; and, when the cellular membrane was detached from them by the scalpel, numerous red points shewed themselves. The par vagum was of a redder colour than usual.\*

\* This dissection was performed by Mr Fearn.



## SUMMARY OF TWENTY DISSECTIONS.

### BRAIN.

Of this number twelve had this organ examined, and, in all, the arteries and veins of the integuments and muscles covering the cranium were distended with the dark blood, which, in some, flowed like tar.

In ten, the blood-vessels of the dura mater were turgid with this blood; and in three, there were fibrinous coagula.

In seven, there was serous effusion under the arachnoid membrane.

In four, the pia mater was congested with blood-vessels.

In seven, the cerebrum was highly vascular; and in one, slightly softened.

In seven, the cerebellum was very vascular; and in three, its substance was slightly softened.

### SPINE EXAMINED IN TEN.

In six, serous effusion between theca vertebralis and arachnoid membrane, and, in one of these, the fluid was bloody.

In two, serous effusion between arachnoid and pia mater.

In six, blood-vessels of spinal chord highly injected with the dark blood; and one with evidence of inflammation between dorsal and lumbar regions.

In six, the spinal or rachidian veins turgid with dark blood.

### GANGLIONIC SYSTEM EXAMINED IN SEVENTEEN.

In ten, the neurilema of pneumogastric nerves was injected with blood-vessels; in one, the nerve was enlarged; in another, it was thickened; and in a third, the neurilema was inflamed with ecchymosed patches.

In six, the neurilema of splanchnic nerves was vascular ; in two, the ganglia at their origins were vividly injected ; and one ganglion was ecchymosed.

In sixteen, one or both of the semilunar ganglia were vascular ; in one, it was inflamed ; in three, it was enlarged and infiltrated with blood or serum ; and, in two, softened.

In eight, the solar plexus highly vascular throughout ; in three, the ganglia and nerves enlarged, and one infiltrated.

In four, the renal plexus was very vascular.

In four, the œsophageal plexuses were vascular.

In one, the recurrent of the pneumogastric nerve was vascular.

In five, the cardiac plexus was enlarged, and very vascular.

#### THORAX.

*Heart.*—In three, the heart was flabby and pale ; in two, collapsed ; and many of them had the left ventricle so contracted and firm, as to contain only a drachm of blood. In thirteen, the right side was full of the dark gory blood, part of which was generally in the state of a fibrinous coagulum.

In three, the left side was full of the same blood with coagula.

In three, the right auricle full of dark blood and coagula.

In six, the left auricle full of dark blood and coagula.

In four, left ventricle was moderately filled with blood and coagula, and one affected with softening ; in two, coagulum extended into aorta.

In five, right ventricle full of blood and coagula. In one, coagulum extended into pulmonary artery. In two, the parietes were softened.

*Pericardium.*—In one, this sac was distended with gas ; in two, it was dry, like paper, and vascular ; and, in a third, dry, vascular, and diaphanous. In four it was vascular. In all, the coronary vessels more or less injected with dark blood.

*Venæ Cavæ.*—In all, more or less of the dark blood was found.

*Pulmonary Veins.*—In six, these veins were turgid with the dark blood.

*Lungs.*—In four, these organs were congested with the dark blood.

*Pulmonary Artery.*—In one, a large coagulum, which extended into its two large branches. In three, it was full of the dark blood ; and, in three others, the vasa vasorum were highly injected:



*Pleura.*—In five, highly injected; and, in two, there was effusion of lymph.

*Aorta.*—In all, it contained more or less dark blood, with fibrinous coagula; in six, the vasa vasorum were highly injected, —the dark blood, and, occasionally, coagula, extended into the carotid, brachial, femoral, tibial, ulnar, and radial arteries.

#### ABDOMEN.

*Peritoneum.*—In nine, this membrane was highly injected; in six, evidently inflamed; and, in three, there was albuminous effusion, with some turbid serum. In one, the omentum was very vascular; and, in another, it was inflamed.

*Stomach.*—Generally of a white colour, both on its peritoneal and mucous tunics, and containing more or less of the rice-water fluid.

In seven, there were distinct vascular patches on the mucous coat, with several ecchymosed spots, varying in size, from that of a sixpence to that of a half crown; and, in all, there was manifest softening. In one, the mucous tunic was eroded.

*Small Intestines.*—In twelve, there were evident marks of high inflammation, and vivid and extensive injection; in nine, ecchymosed patches; in four, mucous tunic softened in many points; and, in one, incipient ulceration. Contents of a viscid white mucous, or greenish colour; and, in two, they were bloody.

*Large Intestines.*—Transverse arch and sigmoid flexure of colon, commonly spasmodically contracted. In five, vascularity, with ecchymosis. Two inflamed, with softening; and one with ulceration. Two with dark venous congestion, similar to intestine in strangulated hernia.

Contents, generally rice-watery, or gruelly and flocculent, occasionally greenish and viscid. In many, the colon, with the exception of the caput cæcum, was empty.

*Liver.*—Very various in colour; two with Bright's yellow deposit. In some, the vena portæ were moderately congested; and, in one, the biliary ducts full of bile.

*Gall Bladder.*—Generally two-thirds full of rather inspissated olive green bile. In the twenty cases, ten were full of this fluid; the others varied from a little bile to two-thirds.

*Pancreas.*—Generally healthy.

*Kidneys.*—Commonly healthy; but varying, like the liver, according to the habits of the individuals. Three were slightly congested; one gorged with the dark blood; and another presented a livid appearance.

*Urinary Bladder.*—In all, contracted, and almost empty. When any fluid was present, it was about a drachm of muco-purulent. One, however, was contracted horizontally, and contained five ounces of limpid urine.



# THEORY

OF

## CHOLERA ASPHYXIA.

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FROM the cases and dissections which I have now detailed, this disease appears to me to admit of a satisfactory explanation, together with a scientific, and, if so, I should trust, a successful, mode of treatment.

The constitution of the individual I consider to be modified or predisposed by the atmosphere for some time before he is attacked.

The atmosphere is unseasonable, — it is warm, damp, and surcharged with the electric fluid ; \* it hence

\* From the examination of the atmosphere by Mr Losh, of Jesmond, an able meteorologist, near Newcastle, the weather, during the prevalence of cholera at that city, abounded more with thunder and lightning than in preceding seasons. (See Greenhow on Cholera, p. 90.) I deeply regret not having seen Greenhow on Cholera until these pages were at press, as I consider it the most scientific and valuable work yet published on the subject. See also “ Some Facts of Electricity observed in Spasmodic Cholera. By a Member of the South Shields Board of Health.” “ Thunder clouds, charged with electricity, frequently take a particular course, without soon wasting or expanding themselves, in a direction along the banks of rivers, or attaching themselves to a particular district or mountain.” “ Electricity rises out of the earth at particular points, being perfectly local in its operations.” When cholera raged at Jassy, a terrific storm dispelled it for a time; and the cannonading at Warsaw also averted it for a time. In India, atmospheric and terrestrial influence

impairs the whole nervous system, but especially the ganglionic system of nerves. The pulmonary plexus is, therefore, unable to endow the lungs with power to oxygenate thoroughly the blood—the cardiac plexus to enable the heart to circulate perfectly the blood—the gastric plexus to empower the stomach to digest the food—the hepatic plexus to influence the liver to secrete the bile—and lastly, the renal plexuses to give energy to the kidneys to secrete the urine; the atmosphere stimulates imperfectly the cutaneous nervous filaments, and capillary blood-vessels. I have left out the pancreas, considering it of minor importance in digestion.

The consequence of this deficiency of nervous energy to these important organs, is, that the chylopoietic and assistant chylopoietic viscera become deranged. Of the truth of this, we have many examples in those who have been victims to cholera. Colliers, from their working under ground, and being thus excluded from the atmospheric air—being in a manner etiolated,

alone can account for its rapid progress. Dr Young observes, that, “in the space of a few days only, it spread through many hundred miles, over the unconnected and far distant districts of Behar and Deccan.” Mr Orton says, “The most obvious, and apparently the only feasible way of accounting for the visitations of cholera, is, that they depend primarily on some disordered state or states of the atmosphere,—that there is a diminution of the free electric fluid in the atmosphere, which is the great cause of the epidemic.” Dr W. Ainslie, in his able Letter on Cholera, favours this view of the subject. Forster, in his work on the casual and periodical influence of atmospherical causes on human health and disease, states, that, through the medium of his electroscope, he has observed an irregular distribution of the atmospheric electricity, during what is termed unhealthy weather by medical men.

In India, and even in this country during the choleric epidemic, many have complained of slight twitchings or cramps in the toes or fingers, and even in the arms and legs. I have lately been often consulted for such feelings.



have been frequently sufferers. The same was remarked to be the case in the poorer inhabitants of Sunderland, Gateshead, and Newcastle, who resided in hovels shut out from the light of day.

When an individual, thus conditioned, with his digestive organs deranged—but much more so with these organs overloaded with indigested food and feces, which have irritated them or produced diarrhœa—is exposed to cold, so as to check the cutaneous functions, a two-fold disease is produced,—a violent colic, and fever.

The expansive cutaneous filaments of the nerves are chilled and excited; the cutaneous capillary exhalants are shut up; these extreme branches of the nerves and arteries produce a concentration of the nervous and circulating systems; reaction is attempted, but their cutaneous branches being rendered torpid and inert by the cold, they produce a determination to the ganglionic system of nerves, and the organs they supply, both of which have been previously impaired and rendered excitable.

An inflammatory spasm of these nerves and their organs is the natural result, and hence the sluggish respiration and circulation—the non-oxygenation and decomposition of the blood—and the non-secretion of the bile, the pancreatic juice, and the urine. The decomposition of the blood must be assisted, by no carbon being elicited from it, either in the lungs, or in the capillary cutaneous system; or, in other words, the lungs will be unable to decompose the atmospheric air—unable to separate the oxygen from the electric fluid with which it is united, so that it may combine with the carbon of the blood, and allow the electricity

to enter the blood ; for the mere inhalation of air into the lungs can neither excite them, nor effect the change on the blood. This is dependent on the living action of the lungs, the main spring of which is the nerves.

Again, each act of inspiration requires a special impression through the nerves upon the muscles which dilate the chest. Mr Brodie's experiments prove, that any diseased condition of the pneumogastric nerves reduces the strength and frequency of respiration ; diminishes the quantity of carbonic acid evolved ; and renders the blood in the arterial system dark like venous. No caloric can be generated in the lungs, or even throughout the whole body, and no bile or urine seems to be removed from the blood ; so that the active ingredients of these fluids are mingled and circulated with it.\*

It is an acknowledged fact among physiologists, that black blood soon impairs the action of the heart. The blood thus vitiated is circulated in the brain, spinal chord, and ganglionic system of nerves, and will impair their functions, and re-act particularly on the circulating and respiratory organs.

The vomiting and purging are consequent on the inflammatory spasm, combined with the overloaded condition of the whole alimentary canal, which must be severely irritated by these ingesta ; and hence diarrhœa is almost always a precursor of the violent symptoms.

To prove that inflammatory spasm is the cause of

\* Dr Christison is making some experimental researches on the blood and secretions of cholera patients, and has already detected urea in the serous effusion of the brain.



the vomiting and purging, (independent of what has been seen in dissection,) we find, that, as the disease advances—as the inflammation continues, and destroys the nervous and circulating systems supplying these organs—so the vomiting and purging, or dejections, cease.

The profuse rice-watery or gruelly dejections, according to Delpech, consist chiefly of the serum of the blood poured out by the mucous exhalants of the intestines; and, in proof of this, the flocculi are fibrinous.

The cramps are consequent on the same inflammatory spasm being communicated through the medium of the ganglionic nerves along the arteries, and from the communication of these nerves with the spinal chord and nerves of volition. This is beautifully but painfully exemplified in Mrs M——'s case, where pressure on the abdomen produced tetanic convulsions of the muscles of the neck and lower jaw.

The blueness of the skin is consequent on the blood not being propelled, with its accustomed vigour and frequency, through the lungs by the heart, and also and chiefly by its not being duly oxygenated.

The coldness is consequent on no caloric being generated in either the capillary pulmonary tissue, or the cutaneous capillary tissue, and by the blood not being arterialized, but remaining carbonized.

This is corroborated by the body becoming warmer some hours after death than it was before; and is ingeniously explained by Dr Kirk, by carbon being a bad conductor of caloric,—the internal heat in the body taking six or seven hours, before it advances to the skin, to equalize itself with the circumambient

atmosphere. The extent of organic disease, seen in the ganglionic system of nerves, will be found to depend on the duration of the symptoms of cholera, and also on the patient having been previously affected with visceral complaints.

In the preceding symptoms, we have a train of phenomena similar to those of violent, continued, or intermittent, or remittent fever ; for cholera I believe to be nothing more or less than fever superinduced on diarrhœa, or fever attacking a constitution with bowels deranged or predisposed from atmospheric influence.

The preceding mode of accounting for Cholera appears to me natural and consistent.

If I had invented a theory, and then searched for data to support it, I might be accused of having given way to imagination, or of having made the morbid phenomena correspond with my own views.

Dr Loder of Moscow, we find, is the first to consider the ganglionic system the chief seat of this disease.

Dr Lichenstadt favours this theory ; for, in some of his cases, he talks of the pain on pressure exciting the splanchnic plexus of nerves.

Mr Orton is of opinion, “ that the proximate cause consists in a diminution of the energy of the nervous system ; and that this extends, in various directions, to all the functions.” Mr Andral considers “ the nervous system to be chiefly engaged in producing the phenomena.”

Mr Baird, of Newcastle, talks of the action of the ventricles of the heart being arrested by spasm, and that the general suspension of the secretions depends upon the branches of the ganglionic system of nerves



supplying the organs of secretion, being in a similar condition.

Dr Greenhow states, that the efficient cause of cholera consists in an impression made first upon the nervous expansion of the alimentary tube, and that on this is ultimately dependant the series of phenomena which follows : that the deprivation of nervous energy is rapidly communicated from the extreme branches to the trunks of the nerves, and thence to the other organs connected with that part of the nervous system.

Mr Hamilton Bell considers, that to the suspension of the power of the great ganglionic or sympathetic system of nerves, is to be ascribed the disease which has obtained the name of Cholera Asphyxia.

We find that Professor Delpech, Drs Coste and Lowenhayn, and myself, therefore, have only been travelling in the beaten track : and that we have been forced to do so, from a careful exploration of the morbid phenomena exhibited in this disease. All the merit we can lay claim to, is an attempt, by minute dissection of the fatal cases of cholera, to explain its nature, and we trust we have succeeded in shewing that it is not an incomprehensible malady. Whatever may be our opinions, it cannot be denied, that we have commenced at the origin of the disease ; and we must be permitted to hope, that others more enthusiastic and able than ourselves will prosecute dissection with still greater minuteness, in order either to the detection of our errors, or the confirmation of the truths which we have advanced. In my humble estimation, Cholera Asphyxia is a disease much more capable of being satisfactorily explained by

morbid appearances, than either intermittent or typhus fever. I will add, too, that the preceding *modus operandi*, or theory and causes of Cholera, appear to me more explanatory and satisfactory, than contagion, malaria, and all unknown and secret causes.

I feel confident, then, that the evils of this disease have been tenfold increased by the dread of contagion; and this remark suggests to me the painful necessity of fearlessly delivering my sentiments on a much agitated question, in regard to which, I must say, the public mind appears to have been egregiously abused. I little dreamt, that a man openly charged with *procuring* evidence in favour of contagion being a vital accompaniment of the epidemic fever of Gibraltar, would have been appointed by the enlightened government of this country, even to examine, far less to decide on a point, of such vital interest and importance to this commercial country, before Cholera had made its appearance among us. Supposing the allegations as to the self-interested motives of this individual to be utterly unfounded, they ought to have been held as an insuperable objection to his being employed on this occasion, so long as they remained uncontested and disproved; while, on the other hand, it might have been expected, by an unbiassed mind, that the special influence of his committed opinions, if allowed to operate, would give rise to some such miserable and destructive regulations, as have been entailed upon us by the Central Board of Health, and the late act of parliament relative to Cholera.\*

\* Mr Fraser, late surgeon of the Civil Hospital, Gibraltar, in his review of the *facts* brought forward by Dr Barry, relative to the late epidemic fever of that garrison, thus expresses himself:—"Dr Barry



The effects of the theory of contagion are not yet fully felt by the British public, who, unless their better judgment surmount their fears, will sink under its terrors.

has so misstated facts, and so darkened many of the most important truths, relative to the history of the epidemic in question, that I fear it will be impossible to enter into an analysis of his paper, without the appearance of personality. I shall only observe, once for all, that my object is *truth*; and if *this* is not to be found (as some have stated) in the arguments, either for or against contagion, to whom are we indebted for so grave a charge? Certainly, not to the non-contagionist. Before the arrival of Dr Pym in the garrison, towards the termination of the malady, the word contagion had nearly become obsolete. So clear and satisfactory were the proofs of the endemic origin of the disease, to those who had witnessed its rise and progress, that no one doubted the accuracy of this doctrine; and Dr Barry himself, soon after his arrival, drew up a paper, setting forth a variety of arguments corroborative of the same." What motive could have induced the latter gentleman to change his mind? When were quarantine laws made in this country? When was a quarantine board established? Who are its members? Men are fallible mortals.—Self-interest, pride, vanity, "vaulting ambition," will make medical men rat like politicians.

Mr F. proceeds to prove that Dr Barry perverted facts, in order to support his own doctrine:—"That a species of evidence," says he, "is admitted as proof, when it favours his doctrine; but is refused, when it has a contrary tendency." "Such," observes Mr F. "is the front and bearing of the channel on which Dr Barry rests his proofs of the introduction of a contagious distemper into our garrison. One man '*said*' to have had '*ague*' at the Havannah, but who shewed no symptoms after his admission, and was discharged in three days; a second, a '*contusion of the arm*;' and a third, '*constipated bowels!!!*'" "The whole evidence is so truly contemptible, and so much at variance with truth, that it disgusted every honest man who heard it." "It would lead me," concludes Mr F. "far beyond the limits I have prescribed to this paper, were I to enter into the detail of all the means practised to fix the blame on this ship. Suffice it to say, that the board of commission already alluded to, after wading through a mass of evidence, and listening to the stories of *witnesses got up for the occasion*, came to the conclusion, (the majority, at least,) that there was not the slightest proof for referring the introduction of our epidemic to the ship Dygden, or to any other vessel. I subjoin the opinions of Colonel Chapman, civil secretary, and of Judge Howell, both of whom may be supposed capable of weighing evidence as fairly as any other of the members of this board. They are as follows:—

At Gibraltar, all who were attacked with the epidemic fever, were expelled the garrison, and encamped on the neutral ground. At Malta, those attacked with the plague, were dragged from their houses, and sent to the Lazaretto, or pest-house, where they were attended only by hired slaves. Some British naval surgeons volunteered their services to attend these unhappy wretches; but their application was treated with contempt.

“Colonel Chapman.—‘Judging from the evidence produced before the board, the manner in which it has been given, together with the description of persons who have been brought forward as witnesses, I am decidedly of opinion, that the late epidemic disease is of local origin. As to the importation of the late epidemic, I am of opinion, that the attempt to prove the introduction of the disease, after months of previous inquiry by those who wish to prove it, has totally failed.’”

“Judge Howell.—‘Upon a careful review of all the proceedings before this board, I am of opinion, that the evidence brought forward has totally failed to prove, that the late epidemic disease was introduced from any foreign source, either by the Swedish ship *Dygden*, or by any other means; and I am farther of opinion, that the late epidemic had its origin in Gibraltar.’”

Mr Wilson, another surgeon of Gibraltar, and Dr Chervin, a French physician, confirm these statements of Mr Fraser.

Dr Greenhow incontestably proves, that Cholera began sporadically at Sunderland, even from the words of Mr Green, a contagionist. Mr Green thus observes, “there was no case of sickness on board the vessel when the pilots went on board.” Again, says Mr Green, “I find that the widow and friends of one of the pilots (Henry) tell two stories about it, totally at variance with each other.” Drs Lorimer and Burton prove, that the “first case in Haddington was sporadic,” and that the three shoemakers, Frazer, Gow, and Walker, never saw a Cholera patient in Newcastle—never saw this man in Haddington—and never have been attacked with Cholera themselves. Cholera is proved to have broken out, at Hamburgh, “in a miserable resort named the Deep Cellar, frequented by beggars, vagrants, and other abandoned wretches.” Dr Hamett says, that “Cholera made its appearance in Dantzic without communication with any unhealthy place.”

In Edinburgh, the first patient, in Adam Street, had no communication with Fisherrow, or any of the other infected towns.



If the public, however, dispassionately examine the writings of those who have seen this disease, they will find a huge preponderance in favour of *NON-contagion*. The majority of the Indian medical gentlemen are *non-contagionists*, as may be seen by consulting the Bengal and Madras reports. “In India,” says Dr J. Johnson, “the contagious nature of the disease was denied by ninety-nine out of every hundred medical men in those parts of the world.” Dr Hamett, who visited Dantzic, is a *non-contagionist*. Almost all the medical gentlemen of Sunderland, Gateshead, and Newcastle, are *non-contagionists*.\* Many who left Scotland contagionists, and visited these districts, have returned *non-contagionists*,—as Dr Kirk, of Greenock: and Dr Laurie, Dr Thomas Molison, Mr H. Bell, and Mr Dickson, who have all lately published on this disease, and Dr James Johnson, in his very able number of the *Medico-Chirurgical Review* for January last, are all *non-contagionists*. Drs Lorimer and Burton of Haddington, who have just published an interesting Essay on Cholera, are also *non-contagionists*. At Musselburgh and Fisherrow the majority are *non-contagionists*.† None of

\* GREENHOW on Cholera. WHITE on Cholera.

† Dr Sanderson, of Fisherrow, at the first meeting of the Medico-Chirurgical Society on this paper, related some interesting facts connected with the non-contagious nature of this disease, and, among others, its having broken down the intrenched barriers of the Lunatic Asylum, and attacked one of its unfortunate inmates. Dr Hamett says, that, at Dantzic, “It did not spare institutions, as the Jail and Orphan Hospitals, which were perfectly shut against all communication with the town.”

At Newcastle, “the disease broke out within the walls of the prison, constructed upon the most approved principles, and where all communication from without was carefully guarded against.” Mr Dick, veterinarian, stated, at the same meeting of the Medico-Chirurgical Society, that horses and cows had, for some months past, been affected with

the medical officers, attendants, or nurses, attached to the Fisherrow Hospital, have been attacked with the disease, which, probably, was there most malignant, since its irruption in Great Britain ; while, on the admission of a typhus fever patient, one surgeon, one male, and three female attendants, were attacked with this fever.\*

The resurrectionists of this city, about twelve in number, have escaped the disease, with the exception of one, who, having received his share of the booty of one body on a Tuesday, kept drinking and debauching until the following Thursday, when he was attacked with Cholera, and died. The Tuesday completed the fifth week from the first body which he had disinterred of Cholera, and he confessed to have raised six during that time. All the while he was leading a most debauched life, and troubled with diarrhoea ; and, on inquiry, I find that no medical student, upwards of a hundred of whom must have been dissecting Cholera bodies, has been affected.

From my conversation with medical men, I may say, that the majority who have not seen this disease, are contagionists ; that many who have seen a little of this disease, are moderate contagionists ; while most who have seen a great deal of this affection, are *non-*

Cholera, and that he could trace no contagion. In stables with twelve horses, only one or two had suffered ; and some died in the spasmodic stage.

\* White of Gateshead, and Greenhow of Newcastle, mention the same immunity of the medical gentlemen and nurses, male and female, at Sunderland, Gateshead, and Newcastle. At Moscow, persons put on the clothes of those who had just died of Cholera, lay in their beds, and even alongside of corpses ; they bathed in the same hot water that Cholera patients had just bathed in before, and all with perfect impunity. I know individuals of Fisherrow, Craighall, and Edinburgh, who have done nearly the same deeds with equal impunity.



contagionists, — simply, I conceive, because they have examined it in all its bearings, — because they have dived into its inmost recesses, and witnessed relatives humanely and fearlessly attending their friends, mothers suckling their dying infants, and infants sucking their dying parents, with impunity.\* I have been wounded in the greater number of my dissections of Cholera subjects, and once severely with a chisel, the wound of which I treated with neglect, and inflammation of the lymphatics of my arm followed; but no Cholera symptoms, although I laboured under slight diarrhœa at the time, and my mind was naturally uneasy regarding the danger of a punctured wound, having suffered severely on more occasions than one.†

\* At Craighall colliery, in the vicinity of Musselburgh, I witnessed these interesting circumstances; and my friend, Mr Steele, the surgeon of the village, states, that five mothers, affected with Cholera, suckled their children; and that not one of these children has been attacked. The same interesting circumstance is mentioned by Mr Frost and Mr John Fife, in Greenhow's work on Cholera. The same has been the immunity with the mothers suckling their dying children. At Craighall, where the disease has now nearly disappeared, the houses are low cottages, with generally two families living under the same roof, and entering by a common door, the air of the one room communicating freely with that of the other. In each of these rooms, there are commonly two beds; and the families consist of from two to ten. The most free communication was allowed, and one or more of the families occasionally slept in the same bed; and yet Mr Steele could detect no contagion. Drs Lorimer and Burton state, that their most malignant cases occurred *in an isolated form*, in the bosom of large families, without any extension. The same has been my own experience and observation in the Canon-gate, &c. of Edinburgh. Mr Steele has been most successful in his practice, having only lost twenty-four out of seventy-two malignant cases, — a proportion unequalled in any returns, — thirty-nine in a complete state of collapse, entirely pulseless. These were all treated in their own houses, although there was a neat and comfortable hospital in the village.

† The same immunity followed the wounds received in dissection by Dr Coste, Mr Steele, and Mr Fearn. At Moscow and Dantzic, where many hours were daily devoted to dissection, the same was the case;

It has been proclaimed by the Board of Health, that the doctrine of the contagious nature of Cholera not only confines the disease to the person and place where it has broken out, but assists in promoting those precautionary measures of insulation used to prevent its spreading to other places. I ask, Have these expectations been realized? I answer, They have been utterly abortive.\* The feeding and clothing of the

and at Newcastle, says Dr Greenhow, "surgeons have spent hours in the examination of dead bodies; have plunged their hands into the several cavities with perfect impunity."

\* The facts already mentioned regarding Behar, Deccan, Dantzic, and Fisherrow, prove this. Orton says, "Besides those who died, above 500 were admitted into hospital that day. On the two following days, the disease continued unabated, and more than one-half of an army, 5000 strong, was then ill." "In fifty different points," says Dr Greenhow, "cases occurred almost at the same instant." Mr Brady thus observes: "We were assailed by a third and fourth example of the disease, and before the next morning at ten o'clock, considerable numbers had fallen sacrifices to its pestilential ravages." "Within a space of twelve hours, it spread itself over a diameter of two miles, in situations as different in their external characters as can well be conceived—all were indiscriminately exposed to its fury." At Newburn, a village distant from Newcastle five miles, "every dwelling was visited by the disease nearly at one time." The same was the case at Gatesfell. "South Shields, only six miles distant from Sunderland, and on the opposite side of the Tyne to North Shields, where the river is merely 100 yards broad, has remained free of the disease for some months, until now, although the communication has been free and constant all the while." Drs Lorimer and Burton state, that "the disease has not attacked the village of Linton, five miles east of Haddington, yet it has prevailed at West Barns, four miles farther east, but has not attacked Belhaven or Dunbar, both within two miles of West Barns. Neither has it attacked Beanston Mill, Knowes, Whittinghame, Athelstoneford, Whitekirk, nor Gladsmuir, all situated within two or three miles of Haddington, and with which the inhabitants of Haddington are in daily communication." Gladsmuir is situated between Haddington and Tranent, and Linton between West Barns and Haddington. The manner in which Cholera has attacked successively, and occasionally simultaneously, the different cities, towns, and villages, since its appearance in Great Britain, ought to convince every unprejudiced mind, that contagion could not be the cause. The



poor have done ten times more good in checking the propagation of the disease, by improving their general health, and thus rendering their bodies better prepared to resist its attacks.\* The records of our hospitals and dispensaries during the latter months, afford a gratifying proof of the altered condition of the poor of this city.

I consider the pernicious doctrine of contagion has let loose upon the public mind one of the strongest auxiliaries to the propagation of the disease, viz. fear.† This is well known, on ordinary occasions, to produce the premonitory symptoms of Cholera, or diarrhœa.‡ The doctrine of contagion hardens the heart—destroys the finer and more amiable feelings of our nature ;

same eccentric dancing of the malady, if I may use the expression, was witnessed in India. In Edinburgh we have had several cases, in defiance of all our terrified and absurd restrictive regulations.

\* The reader is referred to some valuable observations on this point by Dr Greenhow, in his able work, p. 85.

† Many, according to Lefevre, died of pure fright at St Petersburg ; and Dr Greenhow relates several remarkable instances in pp. 32, 83, 84, and 101. Dr Dickson, in his work on Cholera, relates the following interesting anecdote :—“ In the outward voyage to India we experienced a severe hurricane, soon after doubling the Cape. The howling of the wind, the creaking of the masts and the cordage, the dash of the sea over the deck, and the occasional flashes of lightning, were terrific. The passengers were all in a state of great alarm ; and thirteen, of a pack of thirty dogs which we had on board, were attacked the day after with spasms, sinking, and vomiting. They all died in a few hours. In this instance, the disease might be fairly attributed to terror.” Dr Dickson concludes,—“ How much the passion of fear disposes to Cholera, I have had many opportunities of observing.” The influence of the mind over the body is beautifully described by General Stewart in his interesting sketches of the Highland regiments in the West Indies.

‡ Dr M'Cann and Dr Kirk of Greenock, have proved, that the much greater number of cases of Cholera are preceded by diarrhœa. Dr Kirk deserves the warmest thanks of his countrymen for his indefatigable researches after this valuable fact, and many others connected with Cholera.

the kindly affection of the father for his family is blunted or destroyed ; the still stronger link of nature between the mother and her offspring is broken, and she looks upon her innocent children as sources of danger. The hitherto affectionate children, in the deceptive agonies of self-preservation, abandon their parents to perish in the hand of the stranger, and desert them in the last necessities of mortality. No tear of sympathy or compassion falls to soothe the agony of departure from all we hold dear ; no kindly hand is raised to close the eye in death. In this selfish and cowardly contest for life, the ennobling attributes of benevolence and education are disregarded, and civilized man becomes a savage.\*

These considerations come home to the bosom of every man : but there are others not less worthy of inquiry. The minds of the vicious are lulled into fatal security ; so long as the drunkard avoids the infected district, he considers himself beyond its influence ; and, in desperation, consoles himself in the certainty of escape, and halts not in his reckless revelries. The weak and the vacillating flatter themselves with the same reasoning, and heed not the warning of the medical man to attend to their general health while the epidemic is among us, and hence become the hapless victims of their deceptive credulity.

\* The Kirghis Kaisaks, residing on the banks of the Ural, have a very effectual mode of purifying their camps, and extinguishing contagious diseases in the bud, viz. by instantly abandoning their sick to the grim tyrant Death, and moving off to a distance of fifty or sixty miles. The inhabitants of the Polynesian islands, when suffering under sickness, more particularly if they consider the disease irremediable, remove the sufferer to a separate tent, where he perishes from neglect ; or they despatch him with their clubs and spears, and even bury him alive. I ask,—Are we more civilized ?



The medical man who *conscientiously* believes in the contagious nature of this appalling disease cannot perform his duty zealously or effectually. He is only mortal, and, in this enlightened age, he knows that no spell or charm can guarantee him from the demon contagion. He looks afar and transiently upon the dying wretch, writhing under the agonies of the disease, as a forlorn hope, and rushes through the breach, thus conjured by his terrified imagination, instead of manfully grappling with the foe, and wresting the hapless victim from his grasp.\*

Let us next examine the subject of contagion in a national point of view. Here we find it revelling, and protected by the bigotry of antiquated laws, which are a disgrace to the government of this enlightened period. If restriction is to be imposed on the intercourse of the people of this country, I say, let it be done effectually, and in every point; and I call upon the most unflinching contagionist to answer, in what respect can the restriction by sea prevent contagion, while the public conveyances by land are unfettered, and teeming with the daily transportation of thousands and tens of thousands to and from every portion of the united kingdom. In the meanwhile, I am convinced, and the fact is notorious, that, while not a

\* I have witnessed many a contagionist medical man feeling the skin and pulse of the patient with gloves on his hands, a handkerchief over his mouth, and a scent bottle at his nose, and stopping as short a time as possible with him. To do justice to a Cholera patient, the medical attendant must remain with him for an hour or two, and put his own hand to the work. Can the contagionist do so? I reply, No. On this point Greenhow thus observes:—"We must take a leading part in the administration of remedies. We must direct, superintend, and assist in all. We must be content to perform not only the part of the physician, but of principal nurse also, perhaps for many hours' continuance."

vestige of benefit can be adduced, commerce is retarded to the ruin of thousands ; and that the fear of contagion is fostered by the absurdity and barbarity of the quarantine laws, under the superintendence of interested individuals. Innumerable instances can be adduced to prove this, but I shall content myself with one. While Cholera was at its acme, or zenith at Fisherrow, and when the most unrestricted intercourse by land and by foot passengers was allowed, a solitary boat, with two men, touched at Leith harbour from Fisherrow. The poor fishermen had no sooner landed, than they were hurried away, under guidance of a guard-boat, to perform quarantine at St Margaret's Hope ! I ask, Was there more danger from contagion proceeding from these men, exposed in an open boat for six miles to the keen penetrating sea breeze, or from the stage-coach passengers, issuing from the pent-up atmosphere of the stage-coaches, into which some of these very passengers—a medical man probably—may have proceeded, direct from the house of death ?

That the opposite doctrine of *non*-contagion would have secured all the precautionary measures which have been adopted, and that in a much more effectual manner than has been done, I am thoroughly convinced. Every medical man, whatever may be his opinion as to contagion or *non*-contagion, must admit that this disease is epidemic. Had the public, therefore, in place of being terrified with the bugbear contagion, been warned, by the same authorities, of this undisputed fact, that Cholera is epidemic—that it has been cast upon us by the inscrutable workings of divine Providence, which human power cannot avert, and that no man could tell who would be affected or



who would escape, the same precautions as to health, temperance, cleanliness, and attention to the wants and comforts of the poor, would have been observed. The demoralization of the public mind, which has exhibited itself in terrible array at Glasgow, Paisley, and Greenock, and even to a moderate extent at the Water of Leith and Fisherrow, would have been avoided. The kindly intercourse and best affections of the people would have been preserved. Hundreds of miserable creatures, the hapless victims to antiquated prejudices, might have been preserved, or their last moments solaced, by those endearing attentions of kindred, which render death itself less terrible. Commerce would have been unimpeded, and the ruin of thousands averted: the laws of nature and of Providence are as clearly defined in this and in other diseases, as the return of the seasons. And lastly, though not least, the minds of a Christian people would have bowed with reverence and humility to the inscrutable decrees of HIM, whose *fiat* they have vainly tried to avert.

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## TREATMENT.

FOR the sake of perspicuity, I shall consider three stages of the disease.

1. Nearly all the cases I have witnessed myself, and many in England and Scotland, as proved by the indefatigable researches of Drs M'Cann, White, and Kirk, have been preceded by diarrhœa for a longer or shorter period. The greater number of cases,

therefore, are within reach of being successfully treated; and, as Dr White, of Gateshead, observes, —

“ If, after these warnings, in any place where a proper municipal authority is established, the Cholera should burst forth with unabated violence, I should at once consider that there had been some dereliction of duty. The blood of the sufferers will rise in judgment against the apathy, the ignorance, and the cruel neglect of those who should have been, at so awful a crisis, their natural protectors.” \*

The treatment, then, of this stage of diarrhœa, is by administering calomel in three or four grain doses, combined with five or ten grain doses of the aloetic or colocynth pill mass, every three hours, until the alimentary canal is thoroughly cleansed of the undigested food and accumulated *non-bilious* feces, and until the stools are perfectly bilious.

When we examine the feces of a patient in this stage, we find them semi-bilious, with a good deal of undigested food.

Mr Steele at Craighall soon discovered the pernicious effects of camphor, opium, and other stimulants. He confines himself to calomel and colocynth.

To abstract blood, either by the application of leeches to the abdomen, by cupping, or from the arm — probably, both from the arm, and by cupping from abdomen — is necessary. The quantity to be regulated by the pain, and strength of the patient;

\* Dr White here alludes to the division of cities and towns into districts, and which should be visited daily by a medical man. He here follows what Dr Kirk has now established in Greenock and elsewhere. Let our sage Board of Health imitate so praiseworthy and useful an example.



but I may observe, that, in general, moderate bleeding only is indicated.

The diet should be afterwards regulated, and the bowels carefully watched.

2. When the patient is attacked with vomiting and purging, with or without cramps, and has a pulse at the wrist and temple, he should have administered an enema of four, five, or six pounds of hot water, with ten, fifteen, or twenty grains of tobacco boiled in it. Or the rectum and colon should be filled with this weak decoction of tobacco, as hot as the hand can bear, and kept up with a folded towel and the hand, for an hour, in order to subdue the inflammatory spasm. He ought to drink large draughts of hot water; for my friend, Dr Carruthers, of Dundee, observed, that, after the first effort of vomiting, the water remains on the stomach, and the patient expresses himself relieved. I have since prescribed it with advantage. A cloth dipt in boiling water ought to be applied to the epigastric region, to produce vesication, and to act as a counter irritant. Or vesication produced by nitrate of silver, or potassa, or mustard, or nitric acid, may be tried. Vesication should be produced, also, along the whole spine, by the same means, or by the actual cautery. Bags of hot sand, or bottles of hot water, ought to be applied to hands, feet, sides, and every part of the surface of the body, to keep up the heat. The tin cases, or beds, invented by my ingenious and talented friend, Dr Mackintosh, in the Drummond Street Hospital, are admirable contrivances for this purpose.\*

\* Mr Grant's caloritor is a most useful adjuvant. In private houses I have found it raise the temperature of the skin, and restore the pulse in half an hour, in cases of complete collapse. It is about twenty

Twenty or thirty grains of calomel are to be given, in the form of bolus, with half, or one grain of opium and aromatic confection. The less opium the better.

inches in height, formed like a chimney-can, but tapering towards the top, from which there is a tube three inches diameter, that projects in a horizontal direction about eighteen inches. The caloritor consists of two chambers; the external one has a door which slides up and down so as to regulate the admission of atmospheric air; the internal chamber, which is of the same shape, rests upon the bottom, but there is a portion cut out to admit of an iron cap three inches diameter, for holding the spirit of wine, which serves as fuel. When the machine, thus described, is used alone, merely heated air is thrown up; but the vapour of turpentine, spirit of wine, water, &c. may be thrown up in a rarified state; and to accomplish this, there is a small boiler, or still, in the curved top of which are inserted three copper tubes. The middle tube ascends to the height of about twenty inches, on the top of which there is a funnel with a stop-cock; and the turpentine or water is poured in at this funnel when required. At the side of this tube, near the top, is another small tube with a whistle attached to it, as an indication to tell when the boiler below requires a fresh supply.

The two other tubes rise a little above their insertion in the boiler, and, taking a curve, descend in different directions, and pass below the bottom of the boiler, directly through the flame of the burning alcohol, and ascend again, and join into one tube, which arises with the middle tube, and passes out at the head a little above the before mentioned three inch tube, running horizontally, and terminating at its mouth. The next is a reflective box, lined with sheet iron, having a hole in the side, into which the tubes are inserted when going to be used. There is also a damper to regulate the heat, which slides into the larger tube, and a wire cradle to support the bedclothes. The mode of using the machine is as follows: The cradle is put over the patient, and the bedclothes over it; the reflective box can be placed either at the foot or side; the two tubes, introduced then at the side hole in the box, and the damper adjusted, spirit of wine is put in the cup and set fire to. Whatever substance is to be used is to be poured into the funnel, and the stop-cock turned. It descends into the boiler already mentioned, and is there converted into vapour, which, passing through the curved tubes, receives an additional portion of caloric, and becomes highly rarified, ascends and passes through the small tube, and intermingles with the heated air which is rushing through the larger one of three inches, and by that means the vapour is diffused over the surface of the body.

The turpentine should be combined with lime water, in the proportion of one part of the former to four of the latter.



Blood should be drawn from the temporal artery, to the extent of ten, fifteen, or twenty ounces, according to the strength of the patient, and according to its effects on the constitution at the time; and repeated as the system rallies. My able friend, Dr Sanders, and Dr Seeds,\* have found that arterial blood relieves congestion of the venous system much better than venous blood. In the experiments performed by these gentlemen, it was found, that the abstraction of blood from an artery relieved venous congestion and pressure on the nervous system; while that from a vein rather increased the congestion and pressure. Again, abstracting blood from an artery gives a zest to the heart, and excites respiration; while that from a vein subdues their actions. In this last deduction, they are corroborated by the experiments of Spalanzani and others. It is an established fact, that the blood moves exceedingly slow in the capacious venous trunks; and still more so, if its entrance into the thorax is impeded, by the tardy circulation in the capillary pulmonary tissue. And when we consider the oblique entrance of the veins of the brain into the sinuses, and their long and winding course; and also the complex interlacement of the tortuous spinal veins, with their narrow channels of communication with the intercostal veins; lastly, if there is stagnation in the cutaneous capillary circulation, we can expect very little benefit—very little effect, indeed, to be produced by phlebotomy.

If the patient is not sensibly relieved by these

\* SEEDS, *Dissertatio Inauguralis di Sanguine misso.*

remedies in an hour, an enema of plain hot water should be exhibited, and repeated every hour until relieved. The bleeding to be repeated also, according to circumstances.

Calomel and aloes, as in the premonitory stage of diarrhœa, to be given until the stools become bilious and feculent. The common effervescent draughts soothe the pain in the stomach, and quench the thirst, and may be given with marked advantage. The diet should consist of rice gruel, oatmeal gruel, panada, tea, or coffee.

3. If the patient have incessant vomiting and purging of whitish gruelly, or rice watery fluid, with cramps, cold skin, shrunk countenance, livid hands, and no pulse, even at the carotids,—the last arteries commonly which pulsate in this disease,—he is to be treated nearly in the same manner as in the preceding, only a little more actively. Instead of the tobacco, I have employed forty drops of laudanum in the first hot water enema, and kept it up only half an hour, and then repeated the hot water, without the laudanum, every half hour, until the patient was resuscitated. I have given a tablespoonful of hot brandy every quarter of an hour. Whenever the pulse became perceptible, I have abstracted blood; but with great circumspection at first, repeating it within a few hours, and to a larger extent. I would recommend rubbing the arms and limbs with a liniment of equal parts of turpentine and camphorated mercurial ointment—the latter being two drachms of camphor to the ounce of the strongest mercurial ointment—until animation was established. In such desperate cases, the actual cautery ought to be applied to the region



of the stomach, and to the spine, from occiput to coccyx ; for the decomposition of the blood has either commenced, or is on the verge of doing so ; and the skin is insensible to mustard, hot water, or nitrate of silver. Potassa even acts too inertly.

In such cases as these galvanism may be had recourse to, with the view of keeping up life until the other remedies have had time to act. But, if the blood has begun to be decomposed, it will, I fear, rather increase than retard this change. For, according to the experiments of Priestley, Brugnatelli, and others, both venous and arterial blood are rendered darker and thicker when subjected to the positive pole of the galvanic battery. My friend Mr Steele has employed it in two or three cases with apparent advantage. The positive pole should be applied to the nape of the neck, and the negative to the loins, or region of the stomach.\* In one case, the face changed from blue to a natural red colour.

With respect to the administration of oxygen, or nitrous oxide gas to the lungs, I apprehend, on the same principles, there is not time ; or, in other words, the time when oxygenation of the blood would have been of utility has passed. I am of opinion, that the inhalation of the vapour of water by the lungs would be of more use ; and, on conversing with my friend Dr Carruthers on this point, he states, that in some of the hospitals which he visited, where there was moisture combined with the heat, the patients expressed themselves relieved by it. The vapour ought to subdue the inflammatory spasm of the pulmonary

\* For farther information on this subject, the reader is referred to Greenhow, and to Lorimer and Burton's works on this disease.

plexus. Probably the inhalation of tobacco fumes might be beneficial in this view.

Our success in the stage of collapse, must greatly depend on the idiosyncrasy of the patient, and whether or not he has previously laboured under visceral disease.

Regarding the fever which follows, I have treated it with sponging the skin with hot water and vinegar once or twice a-day,—continuing the effervescent draughts, farinaceous diet, attention to the bowels, and cautioning the patient against rash exposure to cold, irregularity in diet, and too great exertion before the constitution was re-established.

The constitution, from the quantity of calomel given, is generally under the influence of mercury for some days, which is rather favourable than the reverse. It keeps up the biliary secretion.

From the rapid decomposition which takes place in the blood of cholera patients; from the insulation of the different portions of this fluid, if I may use the expression, the capillary cutaneous circulation being soon separated from the general mass of the circulating system; from the rapid insulation of the portions of the nervous system, the ganglionic being soon unable to keep up a unity of action with the sensorial and voluntary systems of the general nervous mass,—I am decidedly of opinion, that no patient, when once vomiting and purging of the gruelly or rice watery fluid have begun, with a shrunk face and merely a *cool* skin, and even a pulse distinct at the wrist, ought to be removed from that bed or floor on which he or she lies—not even from a worse to a better bed in the same room. And, during the treatment, they



ought to be warned, that even sitting up in bed, to make water, or to have motion in the bowels, is attended with the greatest danger.\*

It appears necessary, to illustrate properly the disease and its treatment, to insert one or two cases cured.

#### CASE I.

*Feb. 21.—5, P.M.*—Mrs O——, about 55 years of age, is suffering severely from cramps in her legs, and vomiting and purging. The alvine dejections are white and watery, with large flocculi. Those from the stomach are of a dark red colour, and resemble thin panada, tinged with port wine. The skin is icy cold; her hands shrivelled; her countenance dejected, with shrunk features and dark areolæ of eyelids. No pulsation can be felt in radial, brachial, femoral, or carotid arteries; even that of the heart cannot be heard when the ear is applied. Respiration short, hurried, and imperfect. Tongue white and moist. States, that on the 15th instant, she first complained of bowel complaint; but did not apply for medical advice for two days after, when she got a couple of pills, which she understands to have been aloetic, and which moderated the purging during the 19th and 20th; but that the purging increased on the night of the 20th; and that the vomiting began early this morning.

An enema of five pounds of *hot* water, with sixty drops of laudanum, was immediately administered, and kept up with a folded towel for half an hour. A tablespoonful of hot brandy, with large draughts of hot water, were given by the mouth every quarter of an hour. The epigastric region and the spine, from occiput to coccyx, were severely rubbed with potass. A bolus of

\* At Craighall, I witnessed many serious and some fatal consequences, where patients were inattentive to these regulations. Dr Greenhow states, “that he has witnessed fatal effects from the departure from the horizontal position.”

Dr Thomas Molison cites cases where they expired while sitting up in bed to take a drink.

The same was witnessed at Hamburgh.

a scruple of calomel, and a grain of opium, with aromatic confection, was given. Bottles of hot water were applied to the hands, feet, arms, legs, and sides of the body. Allowed to drink *hot* water, or hot gruel of oatmeal or rice.

8 o'clock, P. M.—An enema of hot water, without the laudanum, was repeated between six and seven o'clock, and kept up with a towel for half an hour. The system has now rallied. The pulse is felt at the wrist; her skin is warm; but her countenance is more livid, although warm. The vomiting has ceased; but the purging continues in a moderate degree. Ten ounces of blood were abstracted, which produced fainting. The blood dark, and of the colour and consistence of pitch or tar; and did not separate into serum and crassamentum. Ordered an effervescent draught of the supercarbonate of soda and tartaric acid every two hours.

11 o'clock, P. M.—The bandage and compress had slipped off her arm, from her restlessness; and she thinks that she lost nearly the same quantity of blood as was abstracted before. Pulse is, however, strong, her skin warmer, and her countenance ruddy, the blue or livid appearance being entirely gone. Bleeding was, therefore, repeated; but five ounces produced fainting, and it was stopt.

*Feb. 22.*—8, A. M.—Has slept at intervals during the night, and has had four motions of the same colour and consistence as yesterday; but no vomiting. Skin warm and moist; pulse soft and natural; tongue soft and moist. The blood last drawn has separated into serum and crassamentum. Ordered three grains of calomel, and one-eighth of a grain of opium, made into pill, with aromatic confection, every three hours.

*Feb. 23.*—Stools bilious and feculent; no vomiting; no pain; skin, tongue, and pulse natural. Ordered to continue the effervescents, and to take another pill, which will be four in all. Complains of the vesication of epigastric region and spine; but it does not require any other treatment than simple dressing.

24th.—Febrile reaction has come on. Her skin is hot and dry; her tongue furred and brown; pulse quick and sharp; complains of thirst, and vomits occasionally. Stools feculent. She was bled to ten ounces, which caused syncope. Ordered a mustard poultice to the region of the stomach, to continue the effervescent draughts, and to omit the pills. The wound of arm broke out; and she calculates that she lost as much blood as the ten ounces abstracted. To have farinaceous diet.



25th.—Little or no febrile action; and feels feeble and low, seemingly as much from loss of blood, as from the exhaustion produced by the disease. Bowels natural.

26th.—Is much improved. To have beef tea. From this date she daily progressed, and got out of bed on the 28th.

## CASE II.

*February 15, 1832.*—1 o'clock, P. M.—Mrs D——, aged 38, residing in a wretched hovel in one of the closes of Edinburgh, was attacked with severe vomiting and purging early this morning. The dejections have the appearance of thin gruel or rice water. She complains of burning pain in the epigastric region; has a small, quick pulse, a white tongue, an anxious countenance, with shrunk features, and dark-coloured eyelids, with a cold, shrivelled skin. She states, that she was attacked with purging on the 12th inst., and continued until yesterday, when she took a dose of castor oil, and rashly exposed herself to the cold, and drank freely of brandy.

She was bled to the extent of fifteen ounces, and, during the flow of the blood, the pulse became fuller, but again sank as before, only it was not so quick. An enema of four pounds of hot water, with ten grains of tobacco boiled in it for a few minutes, was administered, and kept up with a folded towel for half an hour. A cloth dipt in boiling water was applied to the region of the stomach. Bottles of hot water were applied to hands, feet, legs, arms, and sides of the body. She had given her a scruple of calomel, with a grain of opium made into a bolus with aromatic confection. Allowed to drink *hot* water or *hot* gruel.

4 o'clock, P. M.—The vomiting and purging were much abated, and there was less pain of epigastrium. Pulse fuller and softer.

9, P. M.—Has vomited little since last report; but the heat of skin is not restored, and pain of stomach continues. To have the hot water enema repeated, without the tobacco. To take an effervescent draught of the supercarbonate of soda and tartaric acid, every two or three hours.

*Thursday, 16th.*—8, A. M.—Has slept none; but is free of pain, and the stools are somewhat feculent. Has vomited more during the night. Complains only of thirst and debility. To have three grains of calomel, with one-eighth of a grain of opium, every three

hours, and to continue the effervescent draughts. To be allowed *hot* tea and toast, or *hot* panada.

*Friday, 17th.* — 8, A. M. — Has slept some. Stools are natural. There is slight febrile reaction; her skin is hot and dry; pulse, quick and small, and tongue red. To continue the effervescent draughts, to have farinaceous diet, and to be sponged with hot water and vinegar three times a-day. To omit the calomel pills.

*Saturday, 18th.* — Continues to improve. Complains of the mercury having affected her gums. From this day she continued to progress, and got out of bed on Tuesday, the 22d February.

In the room where this woman resided, there was a large old bedstead without curtains; a chaff mattress having many holes; a piece of dirty blanket, on which she lay, and a piece of old dirty carpet, which barely covered her. She had on a *chemise*, but had no stockings to put on, or any other apparel. There was a miserable fire-place, and no coals. In this room, there lived her husband, another woman, and two children, all of whom slept either in her bed, or on chests close to it. On the same flat, or floor, there are five families, some of whom, after their fears were removed, assisted us in our operations; but not one has been affected with the disease.

On the evening of Tuesday, the 14th, the day previous to Mrs D——'s attack, two women, from another quarter of the city, were drinking brandy with her, to alleviate the griping pains of their bowels. The sister of J—— S——, who was present, stated, that J—— S—— had been complaining of griping and purging for some days before, and that she had been confined to bed for two days of the week preceding. This woman, J—— S——, died of cholera, on Thursday, the 16th February. The other woman, F——, had been attending one of the Dispensaries for some days previously, labouring under diarrhœa; was complaining of griping pains in her bowels on Tuesday, the 14th February; and had both vomiting and purging on the day preceding, which she attributed to worms. This woman died of a modified species of cholera, on the 26th February.

The foregoing account was taken from Mrs D——, and the sister of J—— S——, in presence of one of my pupils and myself.

THE END.

EDINBURGH:

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